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Text of Decision, Combustion Utilities Corporation vs. Worcester Gas Light Company.[1]

The following is the text of the decision of the U. S. Circuit Court, District of Massachusetts, in the case (in Equity, No. 527) entitled "Combustion Utilities Corporation, *et al.* v. Worcester Gas Light Company," as handed down by Judge Brown, August 11, 1911.

The bill charges infringement of two Letters Patent, to Henry L. Doherty, No. 829,105, August 21, 1906, for "Process of Regulating the Temperature of Combustion in Gas Producers," claims 7, 10 and 13; and No. 844,504, February 19, 1907, for "Apparatus for Regulating Combustion in Furnaces," claim 3.

The Doherty process of regulating the temperature of combustion has as its object to prevent or minimize the formation of clinkers in the furnace and secure a saving in fuel. The formation of clinkers can be obviated by maintaining the combustion at a temperature lower than that required for the formation of the slag of flux.

Water and steam were used to reduce temperature and minimize the formation of clinkers, but with objectionable features. The Doherty invention does away with the use of steam and water. Instead he says:

"I introduce into the bed of incandescent carbonaceous fuel a decomposable gas, preferably carbon dioxid (CO_2), which may be used either alone or mixed with other gases." * * * "I have discovered that the temperature throughout the entire incandescent bed of fuel may be kept down to a point at which clinkering will not occur, by utilizing the heat absorbing effect occurring in the disassociation of the carbon dioxid," etc.

Doherty returns to the grates a part of the waste products of combustion, mixed with air, with the purpose and effect of a regulation of temperature so that slag is not formed.

The claims of the process patent in suit are:

"7. The hereinbefore described process of making combustible producer gas which consists in conducting combustion within a deep fuel-bed by means of air and carbon dioxid, regulating the proportion between the quantity of air and carbon dioxid introduced into the producer, and regulating the amount of such mixture of air and carbon dioxid so as to avoid objectionable slagging of the fuel and conducting said gas unburned to the point of use.

"10. The herein described process which consists in making producer gas from a deep bed of fuel with a draft-current containing oxygen, nitrogen, and carbon dioxid and proportioning the carbon dioxid with reference to the temperature of the draft and the slagging qualities of the fuel to determine and maintain the temperature equilibrium occurring between the heat produced in the fuel-bed by the reaction of the free oxygen and carbon mainly to produce carbon monoxid and the heat absorbed by the endothermic and physical actions at a temperature below the objectionable slagging or clinkering temperature of the fuel.

"13. The herein described process of regulating and controlling combustion in making producer gas, which consists in conducting combustion of oxygen and carbonaceous fuel mainly to produce carbon monoxid in the presence of carbon dioxid, and in maintaining the temperature equilibrium occurring between the heat-producing and the heat-absorbing actions in the fuel bed at a temperature below the objectionable clinkering temperature of the fuel by introducing to a deep bed of the fuel a draft essentially of air and product of combustion and by so regulating and proportioning the ratio of products of combustion and air with reference to the temperature of the draft and the slagging qualities of the fuel, substantially as described, as to limit the temperature as aforesaid."

The practical success of this process or method and its value in obviating the production of clinkers, and in saving fuel are established by convincing testimony.

The defendant, however, sets up anticipation by the prior art, and further contends that, if not fully anticipated, the difference from the prior art is so slight as not to involve the exercise of the inventive faculty. The defendant contends that as a gas producer is an apparatus in which a combustible gas is generated from the slow and incomplete combustion of carbonaceous fuel, that it is the familiar knowledge of the ordinary workman that, in operating a gas producer, he is not to treat it like a coal stove for the production of heat, with the consequent consumption of coal, but, on the other hand, is to keep the temperature of his producer as low as is possible, and thus save fuel; or, in other words, treat the producer as a distilling apparatus rather than a stove.

But this in no wise detracts from the novelty of the Doherty process. Though the specification says:

"The formation of clinkers can be obviated by maintaining the combustion at a temperature lower than that required for the formation of the slag or flux."

1. This decision was partially noted in the JOURNAL for October 16, p. 253. The case has been appealed.

This is referred to not as a discovery, but as knowledge familiar to those in the prior art who employed water and steam to reduce the temperature of the fuel, and thus minimize the formation of clinkers.

The question of novelty and patentability of the process depends upon the means employed by Doherty to reduce the temperature and the advantage over former means. The defendant contends that the prior art discloses the use of a draft current composed of air and carbon dioxid; *i. e.*, the waste products of combustion, and cites specially in its brief the following patents: British Letters Patent, No. 16,207, of 1890, to Frederick Siemens; British Letters Patent, No. 4,644, of 1899, to the same inventor; British Letters Patent, No. 20,083, of 1889, to the same inventor; United States Letters Patent No. 209,554, of 1878, to Eustis; United States Letters Patent, No. 451,612, of 1891, to Biederman & Harvey; United States Letters Patent, No. 442,600, of 1890, to the same inventor; United States Letters Patent, No. 468,834, of 1892, to Frederick Siemens; United States Letters Patent, No. 468,835, of 1892, to the same inventor; United States Letters Patent, No. 692,257, of 1902, to B. E. Eldred.

The compainant concedes that the use of the products of combustion for the purpose of economy by restoring heat to the fuel bed was well known in the prior art. We may assume for the purposes of this case that it was old to return to the grate carbon dioxid, or the waste products of combustion, for the sake of the heat brought to the fuel bed, and it was also old to introduce air to the grates together with the heated products of combustion. There is still to be considered the practical difference between heat production and heat regulation.

Heat regulation by draft regulation is, of course, obvious; but Doherty goes beyond this. His process clearly shows the conception of temperature regulation by a definitely regulated mixture of air and products of combustion admitted to the fuel bed, for the definite purpose of operating a gas producer at a temperature lower than the slagging or fluxing point; or, as Doherty expresses it:

"The invention consists of a process of employing carbon dioxid for regulating the temperature of combustion in a gas producer furnace for heating retort ovens or other purposes."

Assuming that when, in the prior art, waste products were returned to the grate, the carbon dioxid did have the effect of reducing temperature, yet there was, so far as I have been able to learn from the prior patents, no one before Doherty who so employed this temperature reducing effect of the waste products of combustion, or so regulated the proportion between such products and air, as to maintain a temperature suitable for a gas producer, and such as practically obviated the formation of clinkers; a defect which previously was considered unavoidable and put up with as a necessary evil.

It is expressly conceded by defendant's expert that none of the patents of the prior art contains any direct statement regarding slagging or clinkering the fuel. There is no disclosure that anticipates Doherty's statement of what could be accomplished in heat regulation by the means described.

The complainant's propositions that prior to the inventions in suit clinkering was accepted as an unavoidable evil in furnaces and gas producers; that the only means previously employed to mitigate this was water or steam; and that the Doherty process both obviates the use of water or steam, and so thoroughly prevents clinkering that the necessity of removing clinkers, and of the accompanying chilling of the furnaces by the admission of cold air, are obviated, require careful attention.

It is true that Mr. George H. Benjamin, defendant's expert, testifies to a series of tests of the Biederman and Harvey construction for the purpose of determining the best temperature to prevent clinkering, and the best proportion of products of combustion and air for various purposes, and that there was no difficulty in operating the Biederman and Harvey furnace without the production of any perceptible amount of clinker. On the other hand, these tests tend to show that what could be accomplished in heat regulation by proper proportions of the products of combustion and of air was not a matter of familiar knowledge, and was not obvious at the time of these experiments which were made in England in 1884. But the defendant has failed to show that these experiments and the knowledge thereby acquired were ever applied to practical use, or became a part of the familiar knowledge of the practical art. As this record stands Doherty produced a new result in the art; a practical, non-clinkering, gas producer furnace; and made an important contribution to the art by the disclosure of what could be practically accomplished by a new way of applying old means.

Stated in its simplest aspect and disregarding the chemical theory of what occurs above the grates of a gas producer, it was the discovery that by introducing to the grate of a gas producer a mixture containing proper proportions of the waste products of combustion (containing carbon dioxid) and of air at a suitable temperature indicated in his specification, the gas producer could be practically operated in a manner new to the art and with results of commercial value. Of claim 7 Mr. Benjamin says:

"This claim states the obvious. It is unreasonable to assume that any furnace manager would operate his producers so that large quantities of slag, objectionable quantities, would be produced."

But the preponderance of evidence is to the effect that furnaces were so operated, and the common use of water and steam is an indication that it was not known that temperature could be controlled and maintained below the slagging point merely by the careful use of the waste products of combustion mixed with air.

It is, of course, easy to say that the cause of clinkering was well known; *i. e.*, a high temperature; that to reduce the temperature would be obvious, and that to control the supply to the grate of air and waste products of combustion would be an obvious means of reducing the temperature, and thus of preventing clinkering.

The answer to this is that none of the prior patentees cited disclosed this, and that so far as appears none of the many gas producers was so operated as to achieve the result which apparently is well recognized as new and useful in the practical art.

It follows from a view of the prior art that the defendant in operating its gas producer cannot be prevented from using the waste products of combustion for the purpose of restoring heat to the grates, and that the defendant may also introduce air with the products of combustion. As it was old in the art to introduce both air and carbon dioxid the defendant cannot be held an infringer merely because of its temperature-reducing effect, since such effect was necessarily involved in the operation of furnaces of the prior art fed by air and carbon dioxid.

Where Doherty departs from the prior art, according to my undering, is in mixing carefully, and in carefully determined proportions, the products of combustion and air, and in introducing this mixture at a moderate temperature, about 700° F., as indicated by the specification; the heated mixture restoring some heat and thus assisting the generating of carbon monoxid, as in the prior art, but without introducing such an amount of heat as to produce the high temperature at which slagging occurs.

Finding as we must upon this record that the effect of operating a gas producer by such a mixture resulted in the maintenance of even temperature below the clinkering point, and that this was not known to those skilled in the art, the theory of the chemical reactions occurring within the gas producer is of minor consequence. Whatever may be the correctness of the theory of operation if a new application of old means is sufficiently described to enable those skilled in the art to produce a new and useful result, that is enough. (Diamond Rubber Co. *vs.* Consolidated Rubber Co., Supr. Ct. of U. S., April 10, 1911.)

(To be Continued.)

[Continued from Page 314.]

PROCEEDINGS, SEVENTH ANNUAL CONVENTION, NATIONAL COMMERCIAL GAS ASSOCIATION.

Held in Denver, Col., October 24 to 28, 1911.

First Day—Morning Session.

Acceptance of New Members.

On motion of Mr. Frueauff (the President having announced that the acceptance of new members applying during the year was ready for consideration) the applicants were declared acceptable and formally elected. The President, at this point, announced that they would like to have

A Word or Two from Mr. C. W. Hare,

whereupon Mr. Hare said:

Mr. Hare—Mr. Chairman and Gentlemen: I think that those of us connected with enterprises of various characters during the past year recognize the fact that any enterprise once having proven its success, attaches to itself, easily and rapidly, adherents who, only a short time before, were the very ones most willing to cast doubt upon the

principal features of the enterprise. We can all further realize that any enterprise to eventually become successful must pass through years of strenuous effort, and that the men who, during the early period of any enterprise, stood steadfast and worked continuously in the interest of that enterprise, have not had easy roads to travel. I am sorry to say I believe it a human trait to occasionally forget the work of the pioneers; but this Association should not, nor it cannot forget the pioneer in its launching on a successful career. Your Board of Directors, therefore, in meeting assembled, under authority given them in the by-laws, unanimously decided to present to the Convention the name of

MR. LUCIUS S. BIGELOW FOR HONORARY MEMBERSHIP,

in fact the first Honorary Membership that it has been our privilege to confer. [Applause.] I, therefore, take pleasure in presenting the name of Mr. Lucius S. Bigelow for Hononary Membership. [Applause.]

Mr. W. J. Clark remarked he considered it a privilege and pleasure to heartily indorse all that Mr. Hare so gracefully said. The speaker had been closely identified with the Association since its inception, and willingly bore testimony to the tremendous amount of work Mr. Bigelow did for it. Through his indomitable will and personality they could point with pride to the roll of membership (approaching 3,000), which was an honor to Mr. Bigelow. He took pleasure in seconding Mr. Hare's motion. [Applause.]

The President put the motion, which was carried unanimously, and the announcement of the election was received with applause. This

ACKNOWLEDGMENT FROM MR. BIGELOW

followed: I am going to waive, if you please, any formality in responding to this, which has really taken me by surprise, with the exception of an intimation on the part of the Directors yesterday. I am going to say, my dear Mr. Stannard (not Mr. Chairman), and fellow members of the National Commercial Gas Association—and right here I want to say I deem it an exceeding honor to be able to say fellow members, because fellowship means very close relationship one with another, and that has been a characteristic of this Association ever since its inception—I thank you more than tongue can tell for this honor. I consider it the highest honor that this, the largest Gas Association in the world, could pay to any man, and in so saying I would add that I could not consider the accepting of it but for the one reason which is the absolute loyalty that my heart has for this Association from the very beginning, and the determination that, so long as this Association should last and I should live, my efforts would be put forth to the utmost extent in behalf of the Association's interests. I thank you immensely for this remembrance and great honor. [Applause.]

Mr. Frank W. Frueauff took the platform and made several announcements respecting the plan of entertainment, the details thereof, etc.

REPORT OF SECRETARY STOTZ.

The permanent headquarters of the Association have been in existence for almost 2 years, and during this period our Association has had a remarkable growth, not only in numbers, but in prestige, which it now holds supreme in commercial circles.

When the office was opened in New York (February, 1910), our membership was only 1,000, the monthly "Bulletin" at that time being composed of but half a dozen pages each month. With the rapid growth of the Association, first to 2,000 (December, 1910) and now to over 3,000 at this meeting, with over 20 company-sections formed and holding monthly meetings and the "Bulletin" growing in size to a 32-page, sometimes 44-page monthly, naturally the details of looking after such headquarters have increased proportionately.

The duties of Assistant Treasurer have also thrown an immense amount of detail into the New York office, necessitating the employment of two additional clerks during the year.

The Salesmanship Course has now reached the proportions of a well established correspondence school, all correspondence being distributed and received at this office. The class of over 700 is some indication of the success this plan has met with.

Many of the Committee Chairmen have also availed themselves of the assistance which headquarters could render in working out plans and campaigns.

An immense amount of literature has been circulated among the members and every gas company in the country. Over 30,000 "Bulletins" were mailed during the past 10 months. Unfortunately, many gas men have not felt sufficient interest in the work of the Association at first to notice the communications sent them, the result being that later they have been compelled to correspond with the Secretary and get in touch with what has been going on. This has been noticeable, particularly in the case of the standard "Handbook of Appliances." However, this book is now in general use, over 200 gas companies having adopted it, and 60 manufacturers of appliances are prepared to furnish the loose sheets. This does not altogether represent the entire number of companies using the plan, many having failed to notify us of their intention to co-operate in the movement.

The incoming mail to the headquarters of the Association is now rather voluminous; and the outlook for the coming year is such that your Secretary would recommend an authorization for securing larger quarters, the purchase of such office equipment as will facilitate the carrying on of our work, and the employment when necessary of additional help.

Would further offer for your consideration the appointment of an active committee, of not more than 3, all within easy access of New York, to act in conjunction with the Secretary in the preparation of the monthy "Bulletin," the scope of which should be considerably broadened. I feel that our "Bulletin" can be made of considerably more value to its members and the gas industry generally could a strong committee be selected. If necessary, this committee should receive some compensation, as the members are all busy men and cannot afford to devote any great amount of time to a matter of this kind gratuitously.

We should also have the fullest co-operation of the company management in this matter, as the publication of successful selling and advertising campaigns which have been conducted in one locality or another will invariably be of benefit to other companies.

The Question Box should be strengthened and broadened. Committees should submit all their plans in detail for publicity and, by free and active co-operation, our monthly "Bulletin" can be made a standard for gas news and a recognized authority in the industry.

Correspondence has its limitations in securing results, particularly as relates to increased membership, and I would suggest that the Association authorize the payment of a certain sum, either from the treasury or based on a certain percentage of the dues of new members secured, to be used in defraying the expenses of some qualified person in several States to travel and interview every company within a reasonable radius and bring before such companies the advantages their employees would receive in joining the Association and forming company sections. I believe more could be accomplished by this means than through any amount of correspondence and recommend such a plan for your consideration.

Perhaps our members are not fully aware of the privilege they have in seeking information from the various committees. These committees are always ready to furnish data and advice whenever asked for, either by an individual member or by a company.

The Commercial Committee during the past year has been particularly active in this manner, having suggested selling campaigns and secured various kinds of data for many inquirers.

The Advertising Committee Chairman has also, in several instances, supplied copy and advice for various companies, and in these various ways the Association can and will always be ready to lend assistance.

Members who have suggestions to offer, which in their judgment will be useful to the membership generally, are invited to place their recommendations before the Board of Directors and same will be given careful consideration.

The finances of the Association, as shown by the Treasurer's Report, which will be read later on, are in a most healthy state, and leave a very fair working balance with which to conduct the work of the Association during the coming year.

Our Association has a brilliant future before it, and it is needless to assure you that your Secretary places the interests of the Association and its members as a first consideration.

On motion the Report was received and referred to the incoming Board of Directors for consideration.

REPORT OF TREASURER.

As Treasurer, Mr. P. S. Young submitted his report for the year, which showed a balance from last year of $2,678.86, a receipt of $13,423.47, an expenditure of $12,981.11, a cash balance of $3,121.22, and a book earning (not collected) of $5,700.

On motion the report was received and (together with the favorable report of the Finance Committee), ordered placed on file.

Mr. Philmer Eves (Indianapolis) presented the following

REPORT AS REPRESENTATIVE AT CHEF'S INDIANAPOLIS CONVENTION.

At the Convention last year, I informed the Association that a meeting of the International Stewards'Association would be held in Indianapolis, and that that Association had invited me to contribute a paper to its proceedings. President Wrightington thereupon appointed me to officially represent you at that meeting, and President Stannard requested that a report of the meeting be made to this convention. The meeting was held January 31st, 1911. The Chairman, Mr. Edward Krause, proprietor of the Hotels Morton and Edward, of Indianapolis, read the official appointment, signed by Mr. Wrightington, and I have the greatest pleasure and gratification in reporting that the Steward's Association extended the heartiest courtesy and a most cordial welcome. Mr. C. H. Graf, Vice-President of the Indianapolis Gas Company, with about 30 other representatives of that Company attended by invitation, and the meeting was a convivial and business and commercial success.

The topic of the paper was "Wasteful Ways of Using Gas in Hotel, Restaurant and Club Kitchens and the Remedy." The paper and pictures taken during the meeting, were subsequently published in the GAS JOURNALS; it was also published in the July and August numbers of "The Bulletin" of the International Stewards' Association. A copy of it has been forwarded to the Secretary of our own Association to be filed among its records.

We appreciate the opportunity which we had to bring before the International Stewards' Association suggestions of the greatest importance to all gas companies, as well as to chefs and stewards, on the means of securing the highest efficiency in the use of the various gas appliances now almost universally used in hotel, restaurant and club kitchens. The Stewards' Association recognized, on the basis of mutuality of interests, the advantages and economies that would accrue to the hotels, restaurants and clubs where large kitchens are operated, from a general co-operation with the local gas companies.

In the name of the National Commercial Gas Association, the co-operation of all gas companies was respectfully tendered and the Stewards' Association fully appreciated the policy of gas companies in giving to its patrons the very best and most economical gas service. The following letter was subsequently received from the Secretary of the Indianapolis Stewards' Association.

INTERNATIONAL STEWARDS' ASSOCIATION—OFFICE, SECOND VICE-PRESIDENT.

INDIANAPOLIS, IND., March 13, 1911.

MR. PHILMER EVES, Indianapolis, Ind.: Dear Sir—The Indianapolis branch of the International Stewards' Association desire to return to you their sincere thanks for the courtesy extended to them by the National Commercial Gas Association, and for the able and instructive address made by you on "Economy of Gas Cooking" on the occasion of their annual educational session, held at the German House, this city, the evening of Tuesday, January 31st instant. I would request of you a copy of the paper for publication in our "Monthly Bulletin" for distribution among our members in the Association at large. Thanking you again, and with best wishes.

I remain, yours truly, GEO. W. JUNE, Sec.

On motion of Mr. Hare, a vote of thanks was tendered to Mr. Eves for presenting in such an able manner the thoughts of the Association before the Stewards' Association.

The President having said that the

REPORT OF THE ADVERTISING COMMITTEE

was the last one to come before the meeting, Chairman Brock read the report as follows:

As Chairman of the Committee, I would say it is impossible in this short measure to outline our complete plan, which big proposition is one requiring much work; and as your Committee men are all busy ones, it would not be fair to ask them to work the plan out entirely, a plan which entails so much that is difficult. If we can here receive sufficient assurance that our plan may be finally adopted, we will then work it as to the many details and submit same for your final approval. We suggest the establishing of an advertising headquarters, in charge of a competent person under salary. The headquarters' work would consist of writing special advertisements for the daily papers and written by an expert advertising man. Even though written by an expert the matter should be passed for approval by the entire Advertising Committee before being adopted. On final approval, they would be set up and electrotyped, and these sold to subscribers to this fund at actual cost. Another part of our plan is to advertise in the leading magazines and in the trade or class papers. A principal advantage favoring this is that every copy of our advertisements therein would reach possible purchasers, thus enabling us to confine our advertising efforts to an interested clientage. This offers us opportunity to tell a story of interest only to a particular class alone. For instance, it would not pay to advertise hotel appliances in either the daily papers or the general magazines, since only the hotel or restaurant man would be interested in the story of our ads. Appearing in a trade paper, devoted to the interests of hotels and restaurants, we would only pay for circulation reaching parties solely interested in hotel appliances. This is an important point. To make it clearer, let me cite another instance. In, say, planning a campaign of appliances for large laundries, were our advertisements placed in magazines or daily papers that circulate generally, we would reach many who, even though interested, would not have occasion to buy, and so, by confining our advertisements for this line to trade papers that reach laundries, we eliminate fully 90 per cent. of waste; and as this is true of hotels and laundries, so also is it true of other industries. The big fellow, who possibly uses as much gas in a day as would be used by an ordinaay consumer in years, cannot be reached economically or successfully through the general publications. You must talk to him through the trade papers which he reads when he is surrounded by and in the very atmosphere of his business. No gas company can itself do advertising in papers which circulate beyond the lines of mains. The companies must co-operate in this kind of advertising to work successfully. "Co-operation" (the keynote to our whole plan) in advertising is undoubtedly a development attracting much attention of late, and it has been demonstrated by a number of tried co-operative plans that co-operation multiplies results and divides expenses. Some may say those we reach through trade papers are so few as not to be worth trying for, but that idea is far from right. I could make up a list of prospects, taken from among the various trades, that would, but time is too precious for such reading. However, just to show you the wonderful possibilities, let me mention a few prospects: Printers, auto builders and repairers, makers and repairers of bicycles, bakers and confectioners, blacksmiths, bookbinders, butchers, canners, dentists, druggists, dyers and cleaners. Even our electric friends need us; but why go on? In the first four letters of the alphabet, as an index, I have shown more than a dozen possibilities, and this list is far from complete. Another part of the plan is to print booklets, covering the principal gas appliances; and we propose that the manufacturer of these appliances shall stand the booklet expense. All advertisements carried in magazines or trade papers will be written so as to call for replies, which, when received, will be followed by booklets sent from headquarters to the prospect, who will also be sent as many letters as are thought necessary to effect a sale. Upon receiving an inquiry, we notify the gas company in the territory, so that it may work on the prospect from its location; at the same time we are trying to persuade by letter. We are positive the extra business done, as a result of this alone, will show a profit sufficient to more than repay the cost of this to you. Practically every gas company in large and small towns has for years been doing some advertising, or at least paying out money for space in newspapers. In the larger cities, where an efficient advertising staff may be maintained, money has been well spent; but in the smaller towns, where such cannot be afforded, in many instances the best return that can be claimed for space purchased in newspapers is protection against attacks from the publication. Our plan gains for the smaller plants a service supplying them with advertising matter like that which larger plants have. This means that the smaller plant will not only be protected against the newspapers but will also serve to gain satisfied customers and an increased output. It will be our purpose to provide such a service that the large as well as the small companies will see fit to use it. Those having in their employ efficient advertising men know it pays well to advertise in the daily papers; but even you of the larger class must admit that your daily newspaper advertising, although now well done, will be materially strengthened by the advertising we propose doing in the national magazines. You can materially reduce advertising expense by becoming factors in this plan. It is not unusual that the art work on a single advertisement costs you from $25 to $100. Then, if this art work cost could be distributed amongst, say, 700 companies, wouldn't that expense be immensely reduced? By our plan of drawing a design for use in a single "ad.," the design could be used to produce even 1,000 plates. While the greater part of the advertising would be aimed at new business, we would also have to keep in mind our

present consumer, for our competitors are up and doing all the time. It is argued by certain new business managers that their companies have become so strongly entrenched that further advertising for new business is no longer necessary. We question very much if any gas company has thoroughly worked its territory to the point that there is no longer a possibility of increase. Admitting that condition exists, there is still the need of advertising. The commercial graveyard is filled with tombstones inscribed "Here lies all that remains of one who thought he had reached that point where he could afford to stop advertising." What other firm or company is as well known as the National Biscuit Company? Is there an article sold that the buying public is so universally acquainted with as the Uneeda Biscuit? Notwithstanding this, the National Biscuit Company is to-day one of the greatest advertisers, spending thousands of dollars annually, with the object of not only acquiring new business, but of also retaining its present trade. Their last campaign cost them $60,000, and when their managers were asked why they went to so great an expenditure where so little was to be gained in the way of new business, the reply was the expenditure was made solely to insure their present business; that while they were but slightly interested in gaining on the small percentage of business that went to their competitors, they were interested in retaining all the business they already had. The money the Company was spending was securing insurance against forgetfulness and indifference of patrons or the inroads of competitors. Right here is one of the greatest needs for this national advertising. Competitors are after us who are saying things, not altogether in line with truth. There exists the absolute necessity of dispelling from the public's mind the thought, placed there by interested parties, that gas is objectionable on account of its chemical qualities. Reports broadly circulated condemn the modern gas lamp on the score that its heat is harmful to sound hygienic conditions. We know this is not true, for the very heat in turn generates air currents that add to the hygienic conditions of any apartment. If the money we are trying to raise for this great campaign were used to correct this one error alone, it would be well spent. With the amount we have in mind to our credit in bank, we can not only break down these and other barriers placed by our competitors, but also create possibilities for much greater sales. Even further, we will make this advertising educational, not alone as showing the possibilities of gas, but in showing the public our true position. It is up to us to change public opinion, for the public is in a wrong frame of mind. They must be educated and their opinion must be changed. Already many public service companies found the need of so doing. When the national campaign was first suggested, it was suggested that the plan be tried out for a month or two, to determine whether or not it would pay to continue. Your Committee does not agree with this. The campaign must be a prolonged one. We must say a thing over and over again, keeping on until it be so impressed on the minds of our readers that they are forced to accept it. If the campaign is started, provision must be made to continue it for at least a year. To begin with, this national campaign should stand as a proposition by itself. That a company subscribes to this fund should in no manner interfere with the regular advertising done in their local newspapers; one will complement the other. The small individual amount we ask must not be counted on to pay the company's share of a national campaign, and at the same time relieve it of the usual daily newspaper expense. The national campaign must be reinforced by your local campaign—one will help the other, the one making the other stronger. Some companies may contend that our plan is too broadcast and will not meet local needs. It will also be asked why should a company in Pennsylvania pay for advertising to benefit a company in Colorado? Those with such ideas should take into consideration the small amount asked for, which they will at once discover is a very small outlay for the great publicity received, which publicity will most markedly aid the selling department. Gentlemen, what a grand effect would be had on your people if, let me say, there appeared in the *Saturday Evening Post* a double-page, spread, covering some certain appliance, and that this announcement was supplemented with advertisements in the home papers? You would know well in advance the nature of the advertisement that was to appear in the magazines far in advance of publication, subscribers would be furnished with press proofs of all "ads." so that they could plan their daily paper advertising, window display, etc., in keeping with the "ads." in the magazines, so that the readers of the magazine advertisements who, through the reading of the "ads.," already had desire created, could find the very goods advertised shown in the company's windows and described in the company's "ads." Receiving these proofs in advance, you post the salesmen as to what was to be done and they could form "talks" to their customers which would include the articles advertised in the national mediums. The salesmen would find it much easier to sell goods, since prior to their visit the customer would already have a desire for the goods. Some will say there is no need for a national publicity campaign, arguing that publicity for gas companies should be through the daily newspapers; and while we recognize the need of these—in fact, if questioned which would be the better in the event of only one being used, we would declare ourselves in favor of the daily—the magazine and the trade paper have advantages over it. Newspapers are read by busy people, and their life at best is only 24 hours. To catch the eye and thought of the newspaper reader, you must catch quickly. The mental attitude of men or women reading newspapers differs from that of the magazine or trade paper reader. The daily paper reader, being either engrossed in business or the affairs of the day, you cannot hope to interest him in arguments requiring serious thought or study. To get an impression from advertising, he must get it quickly and easily. Again, the life of the magazine is from 30 to 90 days; that is, it will be that long in evidence around the average house. During that time its advertising pages are repeatedly scanned by members of the family as well as by visitors and neighbors. The daily paper is the vehicle for timely annonncement; the magazine page or trade paper page being for the educational campaign. In appealing to the magazine reader, the advertiser is favored through the announcement reaching the reader when with leisure to carefully look through his favorite periodical, or at a time when his mind is not so crowded with other matters as to preclude the chance of your announcement making an impression. Ten minutes' talk with an attentive listener is worth hours with one whose thoughts are diverted. Practically every magazine selected by the purchaser meets his personal taste, or, so to say, is his ideal publication, which fact weighs in favor of the advertiser, for in each publication your appeal is backed by the influence and confidence inspired by your advertisement coming to the reader's attention through his favorite publication. Magazine advertising particularly favors our industry, in that the great bulk of such circulation is in the thickly settled States, consequently we are not paying for circulation reaching towns that cannot support a gas plant. Perhaps no other argument is stronger in favoring magazine adversising than to remember the undeniable fact that readers thereof are as a class the most intelligent, up-to-date and, as a rule, well-to-do people in their respective localities. Therefore, your reminders are confronting those having the intelligence to grasp the arguments you make in urging the purchase of your goods. Summarized, the advantages of this kind of advertising are these:

1. Enormous initial circulation followed by subsequent reading on an average of 5 persons to an issue.
2. Each publication is purchased because it appeals to the reader and influences him favorably towards announcements appearing therein.
3. Their great permanency, as magazines are rarely destroyed unless by frequent handling.
4. Being essentially home mediums they reach the people where and when you wish to reach them.
5. Intelligent, well-to-do, progressive people are not reached as directly, thoroughly and economically by any other method of advertising.

An exaggerated idea concerning the cost of magazine advertising exists in the minds of many who have not investigated the situation thoroughly. To enlighten those who do not know. I have compiled a list (I will be glad to show it to any interested) showing that the cost per line for reaching 1,000 homes is considerably less in the magazine than in your daily papers. I also have a chart showing the circulation of the different leading magazines, as well as how this circulation is distributed. Taking into consideration these figures, we must not forget they represent the actual number of subscribers, not readers; for it has been demonstrated positively time and again that each magazine sold is read by at least 5 people, so to obtain the actual number of readers, it would be fair to multiply the magazine circulation figures by 5, total sum showing the number of readers reached. To sum up, gentlemen, your Advertising Committee volunteers to do this for you: Give our industry publicity through the medium of the daily and trade papers, national magazines, and possibly billboards and street car signs, to influence the general public in favor of our product and methods; aiding and assisting this with a direct appeal through the mail to those who reply to our advertisements; assisting you in securing prospects and closing sales;

preparing and publishing booklets that will actually fit into your sales' plan, which, in some instances, will be furnished free of charge, in others at a price much less than you could get this in your own town; supplying you with a house organ which, due to the great number we will have printed, will cost you so little that you can easily afford to distribute them monthly to all of your consumers—this house organ will contain timely, well-written articles all having the single object of the sale of gas; furnish you with a daily newspaper service better from the point of copy and illustrations than you could personally obtain or afford if you individually paid the bills. In addition, we will attempt to instruct your clerks how to improve their results by an exchange of store ideas, window dressing plans and general sales method. Now, for the cost of this service, which is so small that I am positive you will be surprised on hearing the figures. If the greater number of the companies in this country contribute to this fund, we can raise about $250,000—enough, we believe, to continue this national campaign for a period of 1 year. We ask you, gentlemen, every time you sell 1,000 feet of gas, to set aside for the use of your Advertising Committee just one mill! Had we asked for 1 cent. per 1,000 the amount would have been small, but when it is only 1-tenth of a cent. there is no excuse any company can offer against helping out this grand and glorious cause. [Applause.]

Discussion.

The President—You have listened to the excellent report made by our Advertising Committee, who spent hours and much energy in formulating the suggestions presented. They are desirous that action be taken here this evening to permit the carrying out of their recommendations.

Mr. Eves—At our annual meeting in New York, in Dec., 1909, the subject of the consolidation of gas companies for a national campaign of advertising was brought before us in a paper by Mr. Elcock. At the time I stated that a national campaign, embracing a general education of the public mind on the common principles and benefits of the use of gas, might not be impracticable. I suggested that an advertising bureau in connection with the National Commercial Gas Association, might be a step in the right direction. Sales managers are well aware that, when the manufacturer of some gas appliance makes known his ware in the national magazines, a considerable local demand is created for the appliance. The majority of people are willing and accustomed to read the widely circulated advertisement, and the interest thus aroused creates the demand, so that while most gas companies are exploiting their commodity, and the appliances for its use in the local press and otherwise, the public can be still further aroused by this more comprehensive (or national) method of advertising. The local cost of advertisting is a very important one, and a national bureau, or whatever it may be called, would curtail it materially, especially in the circular or booklet work, by printing in larger quantities, which would reduce the expense. The subject demands earnest consideration, and the Association took a wise step in bringing the matter before this convention.

Mr. A. B. Kelly—I did not intend to make any remarks this moment, but, in connection with Mr. Brock's committee, I extensively canvassed the feeling of some of the gentlemen interested in the eastern syndicates. I have the personal assurance of Messrs. H. L. Doherty and G. Williams of their entire approval of such a plan as this, providing the other companies in the Association are prepared to do their part. Mr. J. D. Shattuck, of the American Gas Company, after I had laid Mr. Brock's report before him, wrote in reply strongly favoring the propositions.

Mr. Hare doubted if a more important matter that that of a national advertising campaign would come before them at the meeting. He felt, however, its importance was such that possibly it would be unwise at this time to take definite action. He was authorized to say, on behalf of the United Gas Improvement Company, provided the campaign was made national in scope, that it would certainly enter on the basis proposed by the Advertising Committee. [Applause.] That the matter might be given closer attention he thought possible at the size of theirs, to beg that the report of the Advertising Committee be referred to the incoming Board of Directors, with the request on the part of the members that definite action be taken within the next 2 months. In the meantime the understanding to be that the present Committee continue its activity along the lines suggested by Mr. Brock. [Seconded and adopted.]

The First Vice-President here assumed the Chair, and the President read the

INAUGURAL ADDRESS.

[See JOURNAL, November 6, p. 299.]

The reading, which was frequently interrupted by hearty applause, was followed by a motion to refer the message to a Committee for consideration and report. The Vice-President appointed as such Committee, Messrs. C. W. Hare, W. J. Clark and E. N. Wrightington. The President thereupon assumed the Chair, and called for the

REPORT OF COMMITTEE ON NEXT PLACE OF MEETING,

which was presented by Mr. H. D. Schall, Chairman. The Committee recommended Atlanta, Ga., as the place, and the time the second week of December. On motion the recommendations were indorsed and the President introduced Mr. J. C. Rushin, of the Atlanta Gas Light Company, who thanked the members for their action, and pledged the city, its residents and his corporation to give them welcome and good cheer.

Here a recess was ordered, to terminate at 2 P.M.

(To be Continued.)

District Holders.

[Prepared for the Sixth Meeting, American Gas Institute, by MR. R. G. GRISWOLD, Denver, Col.]

The district holder may be defined as a holder isolated from the works, for the purpose of assisting the distribution system. They are quite common in the larger cities and may also be found in many of the smaller ones. Some were originally works' holders and became district holders when the manufacturing plant was moved to some other location. Probably the greater number were erected as district holders, pure and simple.

That a district holder helps is proven by the erection of new ones from time-to-time. It helps just as a works' holder helps the works. With a works' holder, only enough gas making capacity to manufacture in 24 hours as much gas as is distributed in 24 hours is required. Without a works' holder, the gas making capacity required at certain times of the day would be several times as great as when using the holder. This may be shown more clearly by reference to a gas load curve, Curve 1. This curve was obtained from simultaneous readings of the station meter and holder contents at intervals of 1 hour for the 24 hours. It will be noticed that at about 6 P.M. gas was sent out at the rate of 87,000 cubic feet per hour, but the total sent out for the day was only 1,000,000 cubic feet, or an average of 42,000 per hour. With the holder, a gas making capacity of 42,000 per hour would be ample, but, without it the capacity would have to be 87,000 cubic feet per hour.

The same relation will hold true with a district holder. If a certain transmission main must deliver 1,000,000 cubic feet of gas per day it would have a capacity of 87,000 per hour without a holder at the point of delivery, but only 42,000 cubic feet per hour if the holder is provided. Many times the main is already laid and the business has increased until it is difficult to maintain good service at the peak of the load. If, now, a holder is installed at the end of this main, more than twice as much gas can be sent through in 24 hours and still give satisfactory service.

It will also be evident that the district holder, or storage capacity in district holders, is of just as much value to the manufacturing capacity as if located at the works. To use the illustration above, if all the gas made were sent through the transmission main before being distributed, the manufacturing capacity required would be 42,000 per hour, whether the holder was located at the works or at the discharge end of the transmission main, but in the latter case the benefit to the holder has been considerably extended.

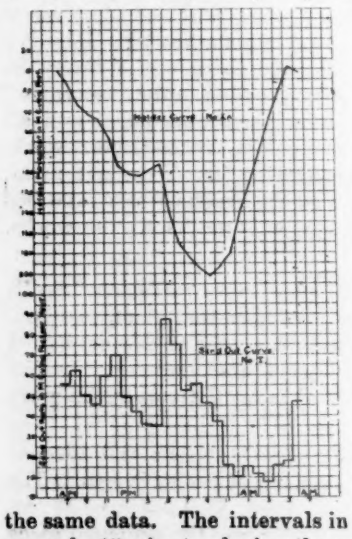
The object of this paper is to advocate that the benefit of the holder be still further extended to include as much as possible of the distribution system. The ideal arrangement would be a holder on each service. The entire distribution and manufacturing equipment would then receive the benefit of a uniform load 24 hours per day. This arrangement will probably never prove practicable on account of increased investment and operating expenses. By grouping these small holders into district holders supplying areas 2 or 3 miles square, the cost is reduced so much faster than the benefits, that a considerable saving can be made by their use.

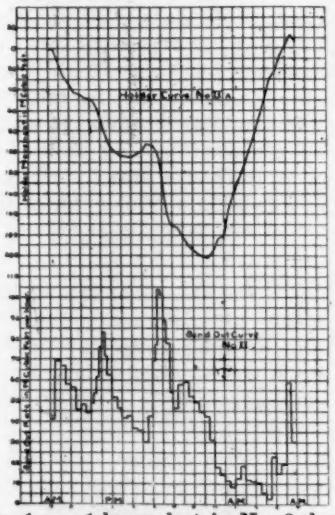
A holder on the end of an isolated transmission main increases its capacity. It would increase the capacity if the transmission main were "tied-in" to the existing mains at every intersecting street and also supplied services. If this is granted, then when an outlying dis-

trict begins to tax a distribution system, that is without a district holder, a holder should be erected within the district in question and tied into the existing mains. The existing mains would act as transmission mains between peaks feeding the holder, but during the peak the holder would feed the mains, thereby increasing their capacity by several times. That is, this kind of district holder would be connected to the distribution mains just like strictly offpeak industrial fuel business, which we would be glad to get at, say, 50 cents per 1,000. During the peak, the holder will supply this gas at $1 per 1,000 to consumers that otherwise we could not handle with the existing mains. The economy of such a transaction is evident.

In order to study the possible economies of district holders on the distribution network, the size of holder becomes of importance. There is a variety of opinion as to the holder capacity required for a given sendout. Some plants have a holder capacity equal to the maximum day's sendout, or more, and yet we can all probably recall plants that did not have a holder capacity more than 30 per cent. of the day's sendout, and yet the service was not impaired. I know of 2 plants that had no trouble, beyond a little extra vigilance, in giving satisfactory service with a holder capacity of 30 per cent. and 25 per cent. of the daily sendout.

In order to study this a little more thoroughly, the accompanying load curves have been collected. They were obtained from all over the country, the idea being to show as much variety as possible. This paper was not started soon enough to get but very few curves covering maximum peak conditions. Load curves appear to be very unusual among gas companies. The majority of these curves were not to be found in the files, but were taken when requested, which was in May. They will, however, serve to illustrate this paper. These curves are from both large and small plants and, therefore, have been reduced to a per million per day basis. Curves 1 and 2 are from

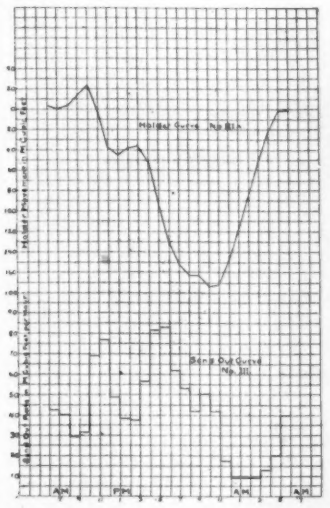


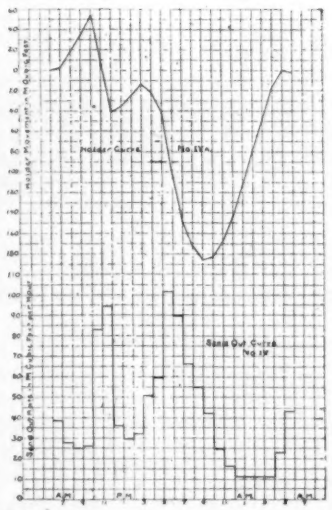


the same data. The intervals in No. 1 are 1 hour, but in No. 2 they are only 15 minutes during the peaks, and ½ hours during the balance of the day. No. 2 is introduced to emphasize the advantage of frequent readings. The taking of readings at least every 15 minutes is strongly recommended. No. 6 has 30 minute readings over the peaks, but the balance are at 1 hour intervals.

Since all these curves represent 1,000,000 sendout per day the averager is a little less than 42,000 per hour. When the actual sendout for any hour is less than 42,000 gas can be put into the holders by an amount equal to the difference between the actual sendout and the average. On the other hand, if more than 42,000 is sent out, the holder will fall to make up the difference between the actual sendout and 42,000. By adding the cubic feet put into the holders and deducting the cubic feet drawn out, interval by interval, the curves marked "sub. a," were obtained corresponding to the several load curves. The total rise and fall of the holders for curve No. 1 is thus, 203,000, or 20⅓ per cent. of the day's sendout. This is all the holder capacity utilized. Any greater holder capacity may be useful to the manufacturing plant, as an insurance against lack of gas due to breakdowns, etc., but will not be utilized ordinarily.

Let us call that part of the total holder capacity actually used (*e. g.*, 203,000 in the example above) the "active" holder capacity and the balance the "reserve" holder capacity. The "active" capacity varies from month to month and even from day to day. Curves 3 and 4 are for the same plant, taken in November and February, respectively. Curves 12 and 13 are for the same plant and both taken in December. As the "active" holder capacity changes, the "reserve" capacity is, of course, affected. The natural growth of the business also encroaches on the "reserve" capacity, until sometimes very little is left, as noted above.





The subject of "reserve" capacity is not within the province of this paper. It concerns manufacturing equipment entirely.

Statistics are not at hand, but undoubtedly 99 per cent. of the money invested in the distribution of artificial gas in the United States, excluding services and meters, is invested between the holders and the consumers' premises. Even in plants using district holders at the terminus of transmission mains, at least 95 per cent. of the investment will be between the holder and the services, and not over 5 per cent. between the holder and the works. Furthermore, this 5 per cent. between the holder and the works never proves so unreliable as to justify any "reserve" capacity. The maintaining of "reserve" capacity in excess of the "active" capacity may be necessary to protect manufacture, but is not necessary and is not used in connection with distribution. Of course, in selecting a district holder, we would not select or demand one just large enough for the immediate "active" demands, but would look forward and select some commercial standard size, with the expectation that in a few years the entire capacity will become active. We do the same with mains, but no one would attempt to maintain his mains at all times any larger than called for by the demand.

To return to the study of the load curves and the "active" capacity required, we note that the demand varies from 83,000, or 8.3 per cent. of the day's sendout, to 116,000, or 11.6 per cent., and the "active" capacity also varies.

The following table shows the peak demands, in cubic feet per hour, and "active" holder capacity required, in per cent., of the days' sendout.

Curve.	Peak, Cubic Feet Hour.	Active Storage Per Cent. of Sendout.
1	87,000	20.3
2	103,000	20.3
3	83,000	19.3
4	102,000	23.7
5	113,000	29.4
6	106,000	19.9
7	91,000	17.3
8	102,000	19.2
9	106,000	22.0
10	91,000	21.4
11	103,000	23.3
12	101,000	22.3
13	116,000	23.6
14	102,000	27.5

First, comparing curves with about the same demand, we find that Nos. 8 and 14 have a demand of 102,000, but the holder capacity required by No. 8 is 19.2 per cent. and by No. 14 is 27.5 per cent. This indicates that whereas the sendout and, therefore, the revenue are the same, and also the peak demand, therefore, the mains are just the same. No. 14 requires 43 per cent. more active storage capacity than No. 8. Nos. 3, 6 and 8 have practically the same requirement in storage, but Nos. 6 and 8 have demands about 25 per cent. greater than No. 3.

These are mostly isolated curves reduced to a common basis for comparison. To deal intelligently with a given case will require many curves covering the whole year, so as to determine with certainty the maximum demand and the maximum storage in actual

(*Continued on page* 330.)

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New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, NOVEMBER 20, 1911.

BRIEFLY TOLD.

DECEMBER MEETING, NEW YORK SECTION, ILLUMINATING ENGINEERING SOCIETY.—Secretary A. J. Marshall, of the New York Section, Illuminating Engineering Society, informs us that the December meeting will be held in the Engineering Society Building, No. 29 West 39th street, New York city, at 8:15, the evening of the 8th of the named month. The paper to be considered is that prepared by Ellice M. Alger, M. D., on the subject of "Conservation of Vision." An invitation to be present is extended to all those interested in the subject.

DEATH OF MR. JOHN GILCREAST.—Another veteran in the gas ranks answered the last call, when death came to Mr. John Gilcreast, at his home, 17 Johnson street, Woburn, Mass., the evening of the 4th inst. His death marked the termination of an illness that lasted well over a year. Born in Andover, Mass., July 31, 1833, it will be noted that time dwelt generously with him, for up to the summer of this year his life was that of one whose health was rugged. In his 21st year (1854) he made a start in business life, acquiring the trade of a machinist, in which vocation he prospered through unflinching persistence. At the outbreak of the Civil War he enlisted in Company K, 39th Massachusetts Regiment, as a private, and served throughout the war; during the major portion of this service his rank was that of Sergeant. The war terminated, he returned to Woburn, and secured employment in a shoe factory, having charge of the machinery connected therewith. One of his employers meanwhile had acquired quite an interest in the Woburn Gas Light Company, and Mr. Gilchreast engaged with him in a minor way on works' operation account. In 1880 he was appointed Superintendent of the Company, and in that capacity he remained until death severed the connection. He was part and parcel of the corporation, and to his energy, persistence and attention may be traced much of the success which the Company achieved. Necessarily his prominence through this connection with the Company in Woburn was considerable, and to its development he gave much attention. For several years he was Chief of the Fire Department, and had served it in various other capacities. He always maintained his connection with the veterans of his regiment, and was a prominent member of the G.A.R., being closely affiliated with the affairs of Post 161. He is survived by his widow, two sons and a daughter.

CURRENT MENTION—

IN our issue for the 6th inst. we said that Mr. Charles E. Ummach, formerly with Messrs. R. Williamson & Co., of Chicago, had purchased the business heretofore operated under the title of the W. S. Edwards Manufacturing Company, of Chicago, and would operate the same hereafter as the Universal Manufacturing Company, with headquarters in 65 East Lake street, Chicago. The real facts are: Mr. Ummach did secure control of the Edwards concern, and will hereafter operate it, not as the Universal but as the Ummach Mfg. Company, thus superseding the Edwards corporation. Mr. Ummach is President of the Ummach Mfg. Company, and its headquarters are in 65 East Lake street, which number is between Wabash and Michigan avenues.

THE authorities of Regina, Saskatchewan District of British Columbia, are preparing to establish a gas plant, to be operated on municipal account. This place now controls and operates an electric light plant, a water works system, a central electric lighting station and a street railway line.

THE Pennsgrove (N. J.) gas plant has been dismantled, and gas is supplied thereto from the plant at Glassboro, N. J.

THE Cleveland (O.) Trust Company asks for proposals for the sale to it of first mortgage, 5 per cent. gold bonds, issued in 1900 by the Citizens Gas Light and Coke Company, of Findlay, O., in an amount not to exceed $5,000. It is stipulated that no bid will be considered in excess of par and accrued interest. Proposals will be received up to noon of the 16th prox.

MR. C. R. GRAVES, Commercial Manager of the Atlantic City (N. J.) Gas Company, has been transferred to the headquarters of the Lansing (Mich.) Gas Light Company. His successor at Atlantic City is Mr. L. N. Yetter, who was Manager of the gas and electric departments of the Public Service Corporation. At one time Mr. Yetter was Secretary of the Wm. Kane Manufacturing Company.

PERHAPS Mr. James Ferrier, the active President and Manager of the Rome (Ga.) Municipal Gas Company, is not a hustler. Here is a specimen of his "activities:" Not long ago there was a heavy demand on the Company for gas for cooking, owing to the "activities" of a Baptist Convention. It was "raining cats and dogs," and all the commercial lighting was in full swing. To cap the climax, workmen in grading a street surface managed to break the gas main. *Dies infaustus.* In 45 minutes they had the break covered, and full pressure on—the pressure did not go below 19 tenths at the works. *Voila tout!*

"B.," WRITING under date of the 10th inst., says: "Hustler" Stull, at Bangor, Me., is making many betterments on that plant, and he is also prosecuting a vigorous buisness campaign for store lighting. I saw Mr. Davis, of the Calais (Me.) Company, the other day, Despite his 33 years of work in its service, he acts as sprightly as he did when he first took over its care."

ARTICLES incorporating the Hood River (Ore.) Gas and Electric Company have been filed with the Secretary of State, Oregon. The incorporators are Messrs. Jas. J. Flynn, Fred. A. Martin and W. M. Daly; the concern is capitalized in $100,000; and the principal place of business is Hood River.

THE Denver (Col.) *News*, of the 8th inst., had this to say: "A change has been announced in the operating end of the Denver Gas and Electric Company, which consolidates the gas, electric and steam heating departments under one superintendent. A. F. Traver, who has been Superintendent of the gas department, has been promoted to this position and will have as Assistant Superintendents, Guy Faller in the gas department and W. A. Carter in the electric department. Faller has been one of the gas engineers of the Company for a number of years, and Carter has held the position of chief electrical engineer. The new Superintendent has been promoted on account of his unusual executive ability. He is known as one of the best gas engineers in the country. Although in his early twenties, he was made Chemist with the Grand Rapids (Mich.) Company by H. L. Doherty in 1902, and was promoted at intervals to the position of Assistant Superintendent of Manufacture, Superintendent and General Superintendent. In 1907 and 1909 he achieved distinction with the Gas Company in Chattanooga, Tenn., where he was General Superintendent, and subsequently was given the position of Superintendent of the gas department of the Denver Gas and Electric Light Company."

THE authorities of Buffalo, N. Y., through the ways and means of Mayor Fuhrman and the other investigators who have be "investigating" ou public account the gas affairs of the city in general, and of the Buffalo Gas Company in particular, are finding out that "tal

ent" comes high. Of course, Mayor Fuhrman was not responsible for the initiatory proceedings, in that these came to him by way of a legacy from Mayor Adams. The latter thought the expense attendant upon the affair would be say $10,000; but now it is figured $50,000 will do. So far, Prof. Bemis has managed to get $1,928 out of it, "Dr." Marks, has absorbed $3,059, and Mr. Desbecker "retained" $9,486.76. And the end is not in sight!

Preliminary Report on Illuminating and Heating Gas, for 1909.[1]

WASHINGTON, D. C, November 14, 1911.—A preliminary statement of the general results of the Thirteenth Census of establishments engaged in the manufacture of gas, illuminating and heating, was issued last Tuesday by Census Director Durand. It contains summaries which give the general figures for 1904 and 1909, and compares the different products by kind and quantity. The statistics do not include gas made in coke and other establishments producing gas as a by-product, or producer and blast furnace gas for power and furnace purposes made by establishments in which they were consumed. The report was made under the direction of William M. Steuart, Chief Statistician for Manufactures, Bureau of the Census. The figures are subject to such revision as may be necessary after a further examination of the original reports.

The Rates of Increase.—The general summary shows increases in all the items of the census of 1909, as compared with that for 1904, except for miscellaneous expenses, which decreased 6 per cent.

The number of establishments increased 27 per cent.; capital invested, 26 per cent.; the gross value of products, 33 per cent.; cost of materials, 41 per cent.; value added by manufacture, 30 per cent.; average number of wage earners employed during the year, 22 per cent.; amount paid for wages, 23 per cent.; number of salaried officials and clerks, 44 per cent.; amount paid in salaries, 46 per cent.; primary horse power, 76 per cent. There were 1,296 manufacturing establishments in 1909, and 1,019 in 1904, an increase of 27 per cent.

The capital invested as reported in 1909 was $915,537,000, a gain of $190,502,000, or 26 per cent., over $725,035,000 in 1904. The average capital per establishment was approximately $706,000 in 1909, and $712,000 in 1904.

Value of Products.—The value of products was $166,814,000 in 1909 and $125,145,000 in 1904, an increase of $41,669,000, or 33 per cent. The average per establishment was approximately $128,000 in 1909 and $123,000 in 1904.

Cost of Materials Used.—The cost of materials used was $52,428,000 in 1909, as against $37,180,000 in 1904, an increase of $15,248,000, or 41 per cent. In addition to the component materials which enter into the products of the establishment for the census year there are included fuel, rent of power and heat, and mill supplies.

Value Added by Manufacture.—The value added by manufacture was $114,386,000 in 1909, and $87,965,000 in 1904, an increase of $26,421,000, or 30 per cent. This item formed 69 per cent. of the total value of products in 1909 and 70 per cent. in 1904. The value added by manufacture represents the difference between the cost of materials used and the value of products after the manufacturing processes have been expended upon them. It is the best measure of the relative importance of industries.

The miscellaneous expenses amounted to $27,757,000 in 1909, and $29,557,000 in 1904, a decrease of $1,800,000, or 6 per cent. Miscellaneous expenses include rent of factory or works, taxes and amount paid for contract work, as well as such office and other expenses as can not be elsewhere classified.

Salaries and Wages.—The salaries and wages amounted to $33,316,000 in 1909 and $25,522,000 in 1904, an increase of $7,794,000, or 31 per cent. The number of salaried officials and clerks was 13,515 in 1909 and 9,406 in 1904, an increase of 44 per cent.; their salaries increased from $8,464,000 to $12,385,000, or 46 per cent. The average number of wage earners employed during the year was 37,215 in 1909 and 30,566 in 1904, an increase of 6,649, or 22 per cent.; their wages increased from $17,058,000 to $20,931,000, or 23 per cent. The primary horse power was 128,350 in 1909 and 73,101 in 1904, an increase of 76 per cent. The average horse power per establishment, considering all establishments, was approximately 99-horse power in 1909 and 72 in 1904.

Gas and Gas By-Products, by Kind and Quantity.—The number of thousand cubic feet of gas produced was 150,835,793 in 1909, and 112,549,979 in 1904, an increase of 34 per cent. Carbureted water gas was the kind most largely manufactured, increasing from 54,687,418 thousand cubic feet in 1904 to 79,418,486 in 1909, a gain of 45 per cent. In 1909 it constituted 53 per cent. of all kinds; in 1904, 49 per cent. Mixed coal and water gas was the next in importance, with 40,775,283 thousand cubic feet in 1909 and 40,980,414 in 1904, a decrease of 1 per cent. Straight coal gas increased from 12,693,034 thousand cubic feet in 1904 to 19,985,253 in 1909, a gain of 57 per cent.

The greatest percentage of increase in specified gases is shown for acetylene, oil, and straight water gas, in the order named, although the quantities of each of these kinds are comparatively small. Acetylene gas increased from 7,880 thousand cubic feet in 1904 to 25,186 in 1909, a gain of 220 per cent.; oil gas, from 3,441,352 in 1904 to 8,688,860 in 1909, or 152 per cent.; and straight water gas from 715,550 in 1904 to 1,726,082 in 1909, or 141 per cent.

There was a decrease in the production of coke for sale from 89,186,434 bushels in 1904 to 82,049,683 in 1909, or 8 per cent.; but the production of tar increased from 67,515,421 gallons in 1904 to 92,152,938 in 1909, or 36 per cent. The figures do not include the gas and tar made in retort or by-product coke ovens. Four establishments engaged primarily in the manufacture of other products made gas, coke and tar as by-products in 1909. If these be added, the figures for straight coal gas become 20,012,811 thousand cubic feet and for acetylene gas 38,256 thousand cubic feet; for coke, 82,094,030 bushels, and for tar, 92,191,308 gallons. The by-products for 1904 are not available. Summaries follow, giving the general statistics for the industry, and the different products by kind and quantity, 1909 and 1904:

Gas, Illuminating and Heating—General Summary: 1909 *and* 1904.

	Census. 1909.	Census. 1904.	Per Cent. of Increase, 1904-1909.
Number of establishments	1,296	1,019	27
Capital	$915,537,000	$725,035,000	26
Cost of materials used	52,428,000	37,180,000	41
Salaries and wages	33,316,000	25,522,000	31
Salaries	12,385,000	8,464,000	46
Wages	20,931,000	17,058,000	23
Miscellaneous expenses	27,757,000	29,557,000	*6
Value of products	166,814,000	125,145,000	33
Value added by manufacture (products less cost of materials)	114,386,000	87,965,000	30
Employees—			
Number of salaried officials and clerks	13,515	9,406	44
Average number of wage earners employed during the year	37,215	30,566	22
Primary horse power	128,350	73,101	76

* Decrease.

Gas, Illuminating and Heating—Products by Kind and Quantity: 1909 *and* 1904.

	Census. 1909.	Census. 1904.	Per Cent. of Increase, 1904-1909.
Gas, cubic feet.....thousands	*150,835,793	112,549,979	34
Straight coal	*19,985,253	12,693,034	57
Straight water	1,726,082	715,550	141
Carbureted water	79,418,486	54,687,418	45
Mixed coal and water	40,775,283	40,980,414	†1
Oil	8,688,860	3,441,352	152
Acetylene	*25,186	7,881	220
All other	216,643	24,330	790
Coke.....bushels	*82,049,683	89,146,434	†8
Tar.....gallons	*92,152,938	67,515,421	36

* In addition, in 1909, 27,588 thousand cubic feet of straight coal gas, 13,070 thousand cubic feet of acetylene gas, 44,347 bushels of coke, and 38,370 gallons of tar were produced by establishments engaged primarily in the manufacture of other products.

† Decrease.

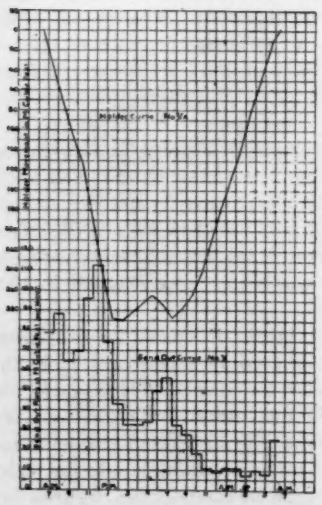
1. Bureau of the Census, Department of Commerce and Labor.

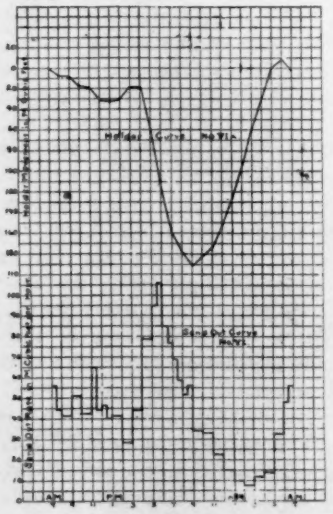
Publications.

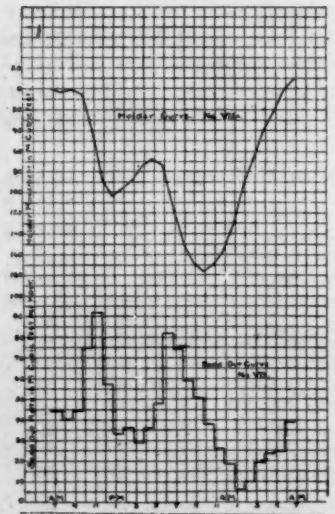
[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

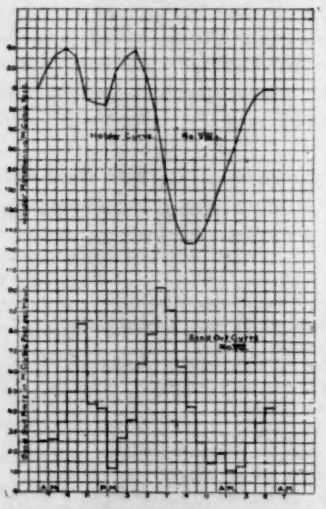
The Southington (Conn.) Gas News.—The November number of the Southington Gas Company's "Bulletin" contains useful information regarding the application of gas for lighting and cooking purposes. The Company's motto is, "To make new friends by giving good service to the old ones."

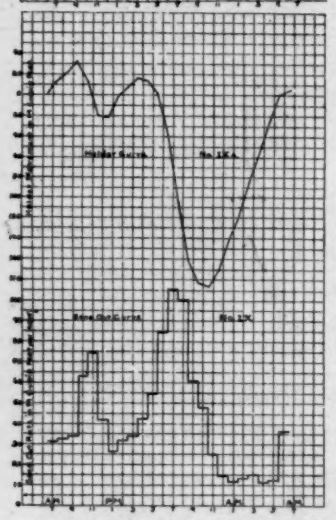
(*Continued from page 327.*)

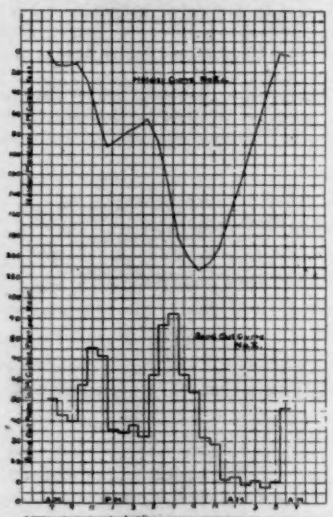


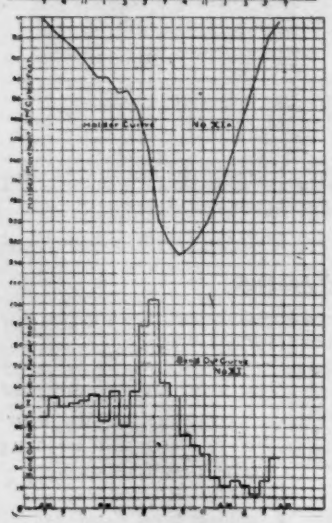


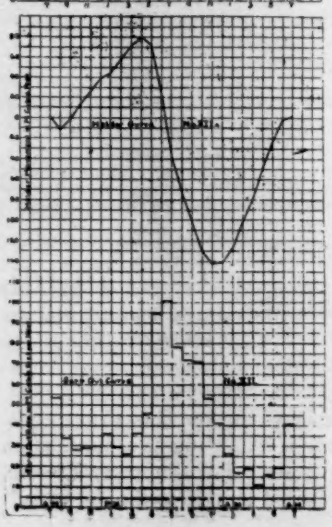


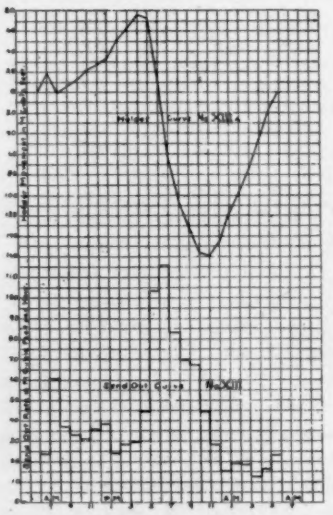


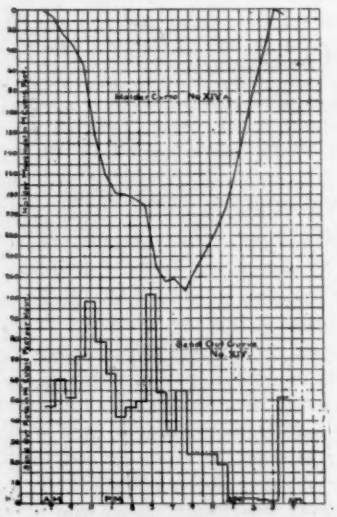










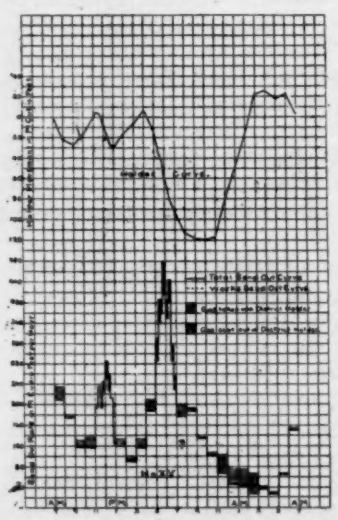


figures. For, example for curves Nos. 12 and 13, the actual data may be stated as follows:

Date.	Sendout in Thousands.	Peak Demand, Per Hour.	Storage Used, Cubic Feet.
No. 12—Dec. 24	4,216	426,000	940,000
No. 13—Dec. 19...	3,975	461,000	934,000

You will note that the maximum demand does not follow the sendout nor the active storage. If we had all the curves for this month we would probably find the maximum sendout on one day, the maximum demand on another day, and the maximum storage used on a third day.

A district holder such as advocated in this paper has been in use in Denver for 2 years. Curve No. 15 may, therefore, be of interest.



The solid curve shows the total sendout, just as it would be without the district holder, and the broken curve shows the sendout from the works alone. The difference between these 2 curves shows the rate at which gas was put into or drawn from the district holder. Curve 15a shows the amount of "active" district holder storage to effect this result.

The full value of a district holder cannot be judged from these curves because this holder is attached to 1 branch of the distribution system, the other 3 branches handling about ¾ of the total gas. However, the peak demand has been depressed about 14 per cent. The amount of active capacity in the district holder to accomplish this result was 4 per cent. of the day's sendout and 25 per cent. of the total active storage.

This method of using district holders does not require any additional holder capacity, but rather a division of the holder capacity into holders of suitable size and so located and connected to the network that the benefit of the total storage is made to apply to as nearly all of the distribution system as possible. In such a system of holders one will be necessary near or at the works and may be included in the works' holder, with whatever "reserve" storage it seems necessary to maintain. The same storage capacity which would become "active" if all storage were at works, would still be ample, if a portion were distributed as district holders. This feature should not be lost sight of. If additional storage must be provided, either "active" or "reserve," the possibility of distributing this additional storage about the distribution network and so increasing its usefulness about 100 per cent. should certainly be looked into. The conditions that particularly favor district holders are:

1. High peak demands. This means there is room for much saving in distribution capacity.

2. The more valuable that portion of the distribution system that can be placed between the holder and the works, the greater the advantage of a district holder. This means long and expensive mains will be given the benefit of a more uniform load curve.

3. When additional storage becomes necessary to provide for "active" storage needs. In this case, the storage must be provided any-

way, and it is only a question of its location. The amount of "active" storage necessary to handle the load curve (whether large or small) has nothing to do with this condition, except in determining the needs of each holder location, so that storage will not be wasted by being too large, or benefit lost by being too small.

Conditions 1 and 2 make district holders possible. Condition 3 may have no weight, because although the plant will in time grow to any reasonable storage capacity, it may take so long that the interest on premature storage investment may amount to more than the value of the holder. No specific pressures have been considered in preparing the paper, as the principle is applicable to any pressure system

Report for 1911, Bureau of Information, American Gas Institute.

[Prepared for the Sixth Meeting, by Messrs. W. G. Africa, H. Burgi, A. E. Forstall, W. H. Fulweiler, J. B. Klumpp, G. T. Macbeth and M. Webb Offutt, Chairman.]

The Committee in charge of the Bureau of Information begs to submit the following report: The Committee for the present year has consisted of 7 members. The same difficulty has been experienced as in past years in getting members of the Institute to present their problems to this Committee. We do not feel that the members are making the most of this standing Committee, and using it as it should be used as a means to secure from reliable sources, without trouble to themselves, certain detailed information which every member must feel in need of some time during the year. We do not take it that it is expected of the Committee to answer all the questions that are asked, but have taken the liberty of getting answers to certain questions from well known authorities.

Question No. 71.—Why have steps not been taken to standardize meter capacities and do away with the present vague classification of 3, 5, 10-light, etc., meters, and 3A, 5A and 10A meters? It seems to me these meters should be classed according to their capacity in cubic feet, with a loss of say .5 inch of water pressure.

Answer No. 1.—Personally, I am unable to find any authoritative information why this has not been accomplished. The rating of 3, 5 and 10-light meters is the rating adopted in England and was used in that country as early as 1850, but I understand that the rate of these 3, 5 and 10-light meters has increased from time to time as minor improvements have been made in the internal workings of the meters, but the increased capacity was always proportionate to each sized meter, this being the reason that 3, 5 and 10-light meters, etc., were able to handle more than the actual number of 3, 5 and 10 lights. The first radical change with which I am familiar in the working parts of the meters was made by the United Gas Improvement Company, at its meter shop in Philadelphia, which increased not only the size of the valve, but also the speed of the meter was increased. These meters, as far as the outside casing was concerned, were of exactly the same size as the regular 3, 5 and 10-light meters, but the inside working parts were of greater capacity and, therefore, to distinguish same, the capital letter "A" was placed after the size of the meter. I believe it is conceded by a great many that the use of 3A, 5A and 10A meters was a success when used on coal gas and natural gas, but were not satisfactory when used on straight water gas. Some of the meter manufacturers are now making what are known as 3B, 5B and 10B meters, which, I understand, are giving good satisfaction to a great many companies on all kinds of gas. The capacity of this meter is between the old type and the "A" meters. After turning all these facts over in one's mind, it would seem that a person would naturally want to know the type of meter he was purchasing, as well as its capacity, and if a meter was ordered of the capacity of an old 5-light, and no type was indicated, the order might be filled by sending a 3A meter. This would be my answer to the question as to the above, although I have no written authority and can quote none for giving it.

Answer No. 2.—The Committee on Uniformity of Gas Meters, appointed by the American Gas Light Association, reported at the first meeting of the American Gas Institute (1906) recommending the meters be designated by their cubic foot hourly capacity, at a standard differential of 3-tenths of an inch water column pressure, and a standard specific gravity of 0.55 for gas, and that the meters should be badged to show the hourly capacity in cubic feet. This report was held over for discussion at the 1907 meeting of the American Gas Institute, at which time Mr. W. J. Serrill, of Philadelphia, presented a written discussion upon the subject, and offered suggestions for a standard. After a discussion, a motion was carried to let the matter rest for a time. No action has since been taken by the Institute, nor by any other Association, to determine upon a standard of hourly capacities and nomenclature. Many meter manufacturers, however, have within the past 5 or 6 years changed their standards, in order to meet the desires of the gas companies for increased capacities, without increase in nominal size of the meters, and for a reduction in the number of various sizes constituting a schedule of meters. These manufacturers in most cases have, in addition to badging the meters as 5-light, 5-A, 5-B, etc., stamped on them the hourly capacity, under a 5-tenths loss, upon the badges. The size of meters, in lights, has generally been used to specify the case dimensions. The stamping of the meter capacities upon the meter badges is desirable, for the reason that the fitting department is enabled to determine at a glance the capacity of any several makes of meters which may be in stock, and thus be assured that the particular meter set in each case is of the capacity required to supply the consumer. This capacity rating, however, would not answer for making up of meter schedules, meter records, or for use in convention relative to meters, for the reason that such numbers might easily be mistaken for the company's or maker's number, or for the index reading. It is obvious that some shorter and more characteristic method of designating the normal size of the meters should be employed, and for the purpose, the present method of using "light," or a letter of the alphabet after the numeral used to designate the nominal size, seems to satisfactorily answer the purpose. The following schedule of meters has been adopted in Philadelphia, and replaces the old schedule, consisting of 12 sizes, as these sizes should cover all the needs, and greatly reduce the number of meters and repair parts to be kept in stock:

Size.	Capacity (C. F.).	Size of Screws.
5-light	100	5-light.
5-A	175	5- "
10-A	375	10- "
30-A	875	30- "
60-A	1,800	60- "
150-A	3,400	150- "

The above capacity was determined with 5-tenths differential and a gas with specific gravity of 0.55. Considerable information relative to the question of uniformity in consumers' gas meters may be obtained by reading the following articles:

"Consumers' Meters," Vol. 22 (1904), page 610, *Progressive Age*: "Report of the Committee on Uniformity of Gas Meters," Vol. 24 (1906), page 720, *Progressive Age*, and "Discussion Upon the Report of the Committee on Meters," Vol. 26 (1908), page 189, *Progressive Age*.

Question No. 72.—"A gasholder with a steel pit which does not leak at all is located near a residence section of this city. The water has been in the pit a long time and has acquired a very foul odor. Is there any way, short of changing the water, of getting rid of this odor?"

Answer No. 1.—The odor referred to in the above question is evidently an odor which arises from drip water which, we know, is very hard to overcome. My suggestion in regard to this matter would be to put into this tank, approximately, 1, 2, or possibly 3 feet of water introducing same about 3 feet underneath the surface on the outside of the holder tank through a short pipe or nozzle which would cause the water to rotate very slowly around the holder tank at the same time allowing the water to overflow. This would take off the top of the water for the circumference of the tank and after this was done, I would suggest using a liberal quantity of "Liquid Germo," which can be purchased from the Read & Holiday Co. "Liquid Bleach," manufactured by Messrs. Roessler & Hammacher, may also be used. If that did not stop the objectionable odor and complaint entirely, I would repeat the operation again after a week or 10 days. This suggestion has not been practically tried out, by me, but our Companies have used "Germo" considerably in killing the odor from drip water in cellars and residential sections with some success, and it is the best material that I know as a disinfectant for drip water.

Answer No. 2.—A gasholder with a steel tank which does not leak should not give off any objectionable odor, unless some of the water gets on the outside of the holder between the tank and the outer lift. This is generally caused by the holder blowing at some time, or getting so near the blowing point that condensation on the inside will pass to the outside of the lower lift. If the condensation inside the holder reaches a depth that will cause this to occur, steps should be taken to remove it from the interior of the holder to prevent a recurrence of the trouble. All water in holder tank, however, is saturated with gas, and this saturated water, of course, gets between the outer lift and the tank, but as a rule it does not give off a very strong, objectionable odor.

Question No. 73.—What is the best method of determining the total sulphur in purifying material?

Answer.—If a Parr bomb calorimeter is available, the quickest and most satisfactory method is as follows: Thoroughly mix ½ gram of finely divided oxide with ½ gram of c-p. benzoic acid. The sample thus prepared is then placed in a Parr bomb calorimeter and 1 gram of finely powdered potassium chlorate and 10 grams of sodium peroxide added. The whole is stirred with a glass rod until thoroughly mixed. After closing the bomb and placing it in water, the mixture is ignited with a heated iron slug, or by electric current, according to the type bomb at hand. After combustion is completed, dissolve contents of bomb in hot water, wash out carefully into a 400 cc. beaker, and filter off precipitate. The new, clear solution is neutralized with hydrochloric acid, and finally made slightly acid with hydrochloric acid. Bring to a boil and precipitate sulphur trioxide with barium chloride (15 cc. of 10 per cent. barium chloride solution). The beaker is left standing in a warm place until the suspended barium sulphate has precipitated, and the latter is then filtered off over a small filter-paper, and well washed with hot water until free from barium chloride and sodium chloride (if a drop of silver nitrate solution placed in a small quantity of the washing remains clear, no more chlorides are present). The filter-paper is then dried and finally burned in a weighed crucible until perfectly white. The total weight of the crucible and precipitate, minus the weight of the empty crucible, is the weight of the barium sulphate, which, multiplied by 0.137, gives the per cent. of sulphur in the barium sulphate, from which the per cent. of total sulphur in the oxide is calculated according to the formula: 2 × 100 × 0.137 × weight of barium sulphate. If a Parr calorimeter is not available, the following method may be used: ½ gram of the finely divided oxide is digested in 50 cc. of fuming nitric acid. After half of the acid has evaporated, add gradually about 2 to 3 grams of potassium chlorate, take down to dryness, and bake for 1 hour. After cooling the beaker, add 30 cc. of dilute hydrochloric acid (½ acid, ½ water) and digest, bringing it to a boil; dilute to about 100 cc. and boil. After boiling for about 5 minutes, filter, add to the clear filtrate barium chloride, and continue as above. Lunge, in his technical methods of chemical analysis, gives an excellent method which is very short, but requires a little more apparatus. From ½ to 1 gram of the finely divided oxide is weighed out in a porcelain boat, then placed in a glass combustion tube drawn out at one end and connected with a Liebig absorption bulb, or Meyer's sulphur bulb (so-called 10 ball bulb) containing either hydrogen peroxide or bromine water. After the boat is placed in the tube, the other end (not drawn out) is closed with a cork stopper (no rubber stopper should be used), and connected with a holder containing oxygen. Heat is applied under the tube where the boat is placed and oxygen passed through the tube very slowly (about 1 liter in 15 minutes), then the train swept out with air. The sulphuric acid absorbed in the absorption bulb is transferred to a beaker, titrated with standardized alkaline solution (1 cc. = 1 cc. N/10 H_2SO_4), and the results calculated. The reaction is as follows: The spent oxide contains sulphur most likely in three different forms, some as free sulphur, and some combined with the iron as iron sulphide (FeS) and pyrites (Fe_2S_2). The oxygen passing over this heated mixture oxidizes all the sulphur into sulphur dioxide, and this sulphur dioxide, passing over this hydrogen peroxide, is oxidized to (H_2SO_4) sulphuric acid according to formula: $H_2O_2 + SO_2 = H_2SO_4$. Bromine water has the same effect. The formula, however, is a little more complicated: $2H_2O + 2Br + SO_2 = H_2SO_4 + 2HBr$. The hydrogen peroxide method is preferred by most chemists, as it does away with the offensive bromine odor, but a larger excess must be taken to insure accurate results. A correction must also be made for the acidity of the hydrogen peroxide. The entire determination can be done in about 30 minutes. If only free sulphur is desired, the method is as follows: Treat 1 gram of the dry sample in a Soxhlet extracting apparatus with purified carbon bisulphide, taking care to have the same inclosed in 2 thicknesses of filter-paper, folded into the shape of a funnel. Continue the extraction until all tarry matter is extracted as is evidenced by the solution running colorless. Distill off the carbon bisulphide and, when all odors of same have disappeared, the flask is weighed. The increase in weight represents sulphur and tar. The sulphur is separated as follows: Treat the sulphur and tar in the flask with about 25 cc. of pure concentrated, red, fuming nitric acid, and warm gently at first, allowing it to stand until all particles of sulphur have dissolved. It is a useless waste of time to hurry the oxidation, for, if a high temperature is employed at first, the sulphur will be melted into globules, which in this condition are very difficult to oxidize. After all the sulphur is dissolved, add about 1 gram of potassium chlorate (the amount depending on the amount of tar present) in small quantities at a time, in order to destroy all organic matter, which, if allowed to remain, may interfere in the subsequent operations. Evaporate with concentrated hydrochloric acid until all chlorine and nitrous fumes have disappeared, taking care, of course, that the solution is not allowed to go to dryness. Take up with water, filter off any residue, and precipitate the sulphur with barium chloride; wash, ignite and weigh as barium sulphate. Barium sulphate × 0.1373 = per cent. sulphur.

Question No. 74.—When a meter is brought in for test and repair, is it the general practice to test for and repair leaks before testing for accuracy?

Answer.—Leaks found in meters brought in from service should be repaired temporarily with soap or putty, previous to testing the meters for accuracy of registration. To determine the presence of a leak, the meter should be connected to the prover, as soon after removal as is permissible, and a small quantity of air or gas passed from the prover through same. Seal the meter outlet with the palm of the hand, then close cock on prover and watch for any drop in the water level in the gauge. If a leak is indicated, it should be located by means of soapsuds and not by means of a small flame. It is reasonable to believe that any leaks found in a meter at the time same is brought in for test are of recent origin, unless they are extremely small, and in consequence, in order to determine the proof of the meter, the proper procedure is to make the meter tight previous to making the test. It might be borne in mind that leakage in the case is unregistered gas.

Question No. 75.—What are the requirements necessary in spent oxide to make it available for the manufacture of sulphuric acid?

Answer.—The requirements necessary in spent oxide to make it available for the manufacture of sulphuric acid are that it should contain a high percentage of sulphur (not less than 40), and be comparatively free from tar.

Question No. 76.—What is the minimum time that cement joints should be allowed to set before testing under the following pressures? First, 3 inches of water pressure; second, 12 inches of water pressure; third, 30 inches of water pressure; fourth, 5 pounds of water pressure?

Answer No. 1.—First, 3 inches of water pressure can be tested as soon as joint is finished; second, 12 inches of water pressure can be tested 30 minutes after the joint is complete; third, 30 inches of water pressure can be tested 1 hour after joint is complete; fourth, 5 pounds of water pressure can be tested from 1½ to 2 hours. This time would somewhat depend on the kind of cement used in the joints. If a slow-setting Portland cement is used, I should not think it would be safe to use the above schedule, but we have no trouble in using the above schedule when joints are made with Dyckerhoff cement.

Answer No. 2.—First, 3 inches water pressure, 2 hours; second, 12 inches water pressure, 2 hours; third, 30 inches water pressure, 3 hours; fourth, 5 pound water pressure, at least 4 hours. It has been stated by a prominent authority that cement joints well made will bear testing for ordinary street main pressures of say 3 inches 1 hour after being made, but it is safer to allow an interval of 2 hours. The quality of cement will, of course, modify the time to be allowed before testing. Some quick setting cements will permit of testing in even less than 1 hour, but it will be safer to follow the above time schedule.

Question No. 77.—(1) What is the proper method of making an accurate quantitative test for naphthaline in coal gas, water gas or mixed gas in a purified state? (2) Is there any difference in making the test at different stages in condensation and purification?

Answer.[1]—At first sight, the estimation of naphthaline, either in pure or impure coal gas, does not appear beset with any great difficulty. The well-known fact that the vapor of naphthaline precipitates naphthaline picrate, when passed into a strong solution of picric acid, is apparently all that is necessary on which to base a method of estimation, but it is found to be impossible to estimate naphthaline in coal gas by merely passing a measured quantity of the gas through a picric acid solution and the weighing the ppt. so formed as naphthaline picrate; because, in the first place, all the hydrocarbon will not combine with the picric acid, but some of it condenses out in the free state. Secondly, a quantity of naphthaline invariably condenses in the delivery pipe and connections of the ap-

1. From "Jour. Soc. Chem Ind.," Vol. XXIV., No. 24, "The Estimation of Naphthaline in Coal Gas," by C. A. D. Gair.

paratus; thirdly, with coal gas containing quantities of ammonia the picric acid is neutralized to some extent, ammonium picrate being formed, which destroys any degree of accuracy. * * * To guard against loss of naphthaline by condensation in the pipe leading to the apparatus, it is well to have a connection as near the main as possible, and to surround it by a steam jacket. The author has found this an immense advantage in all methods of estimation. Colman and Smith's test is really devised for pure (or nearly pure) coal gas, but it can be made to give gravimetric results with cool, impure coal gas, if the ammonia is removed. This is effected by means of oxalic acid solution, maintained at a temperature of about 80° C. All that is necessary is to introduce a Woulff s bottle containing the hot liquid in front of the bottles holding picric acid solution. "One other method for the gravimetric estimation of naphthaline in coal gas may be cited here. This test, devised by the author, is founded on the action of a suitable solvent. The solvents for naphthaline which are applicable for its estimation are few and far between, and in this case use is made of acetic acid of a specific gravity of about 1.044. About 350 cc. are taken in two Woulff's bottles or towers. A small Woulff's bottle containing 150 cc. of picric acid solution is also added after the acetic acid to act as a catch, and a measured column of gas, not more than 3 to 6 cubic feet usually, passed through at the rate of about 1 cubic feet per hour. If the gas is impure, use is made of the hot oxalic acid solution, as mentioned previously. In the event of there not being sufficient pressure to force the gas through the wash bottles, or if the gas be under vacuum itself, use is made of a piece of apparatus which pulls the gas through the bottles by means of a water pump and then automatically separates it from the water, the gas passing through the experimental meter at ordinary atmospheric pressure. After the experiment is finished, the acetic acid and picric acid from the bottles are mixed in a flask, and about 500 cc. of concentrated picric acid solution added. Pure naphthaline picrate separates out at once, in large, flocculent masses, which have the advantage of being extremely easy to filter. After filtering, the naphthaline picrate is dried in vacuo or in a warm room and weighed. The method was proved to be correct in the following manner. A small corked bottle or U-tube was taken, having inlet and outlet tubes, a quantity of pure dry naphthaline crystals inserted in the bottle, and the whole weighed. The bottle was then connected up to a supply of coal gas from which every trace of naphthaline had been removed. The Woulff's bottles containing acetic acid were connected, the experiment started and allowed to proceed for some time. The gas was then shut off, the bottle stoppered and placed in a desiccator for a few minutes and again weighed, the difference in the two weighings being the quantity of naphthaline passed into the bottles. The same process of precipitation, etc., was gone through as previously described, care being taken that any naphthaline crystals that might have been condensed in the colder parts of the apparatus, were first dissolved in a small quantity of alcohol and then added to the acetic acid. The quantity of naphthaline found by calculation was then compared with the quantity found by actual weighing. The results of experiments were as follows:

Weight of Naphthaline Passed in Grains.	Weight of Naphthaline Found by Experiment in Grains.
0.500	0.470
0.800	0.778

And using air as naphthaline conveying agent:

Weight of Naphthaline Passed in Grains.	Weight of Naphthaline Found by Experiment in Grains.
0.500	0.491
0.550	0.537
0.400	0.394
0.400	0.394

Showing that the method is sufficiently accurate for all technical purposes, the average error being about 1.8 per cent. As regards coal gas, numerous comparative experiments were made with Colman and Smith's method, and a few of the results are here appended:

	Acetic Acid Method. Grains of Naphthaline per 100 Cubic Feet of Gas.	Colman and Smith's Method. Grains of Naphthaline per 100 Cubic Feet of Gas.
Pure gas.....	39.4	38.4
	30.1	29.5
	31.3	32.0
	38.4	38.2
Impure gas...	33.1	36.7
	35.8	35.8
	55.6	48.4

"It is almost unnecessary to state that in no experiment was any length of rubber tubing left exposed to the gas, because of its power to absorb large quantities of naphthaline. It should be mentioned, in conclusion, that the reason for adding such large excesses of picric acid in the alcohol and acetic acid tests is because naphthaline picrate itself is quite soluble in both alcohol and acetic acid."

Question No. 78.—Taking into consideration economic operation of the fitting shop, and consideration of the desire upon the part of the new business department to have orders promptly executed, what is the maximum time that should elapse between the receiving and the completion of the following orders sent to the fitting department: A. Straight deliveries? Ans. Same or next day. B. Lamp adjustment? Ans. Should receive immediate attention. C. Range and water heater lines? Ans. Not over 3 days.

Question No. 67.—What is the maximum permissible leakage per mile of main, reduced to "three-eighth basis," before systematic barring should be begun?

Answer.—It must be borne in mind that gas unaccounted-for includes actual leakage shrinkage in volume due to condensation, and gas passed and not registered by consumers' meters. Under normal conditions the gas unaccounted-for per mile of 3-inch main per year should exceed 150,000 to 200,000 before any systematic barring of the main system be undertaken. In thickly settled districts the gas unaccounted-for is naturally greater than in sparsely settled districts. The paving conditions and the conditions of traffic might affect the cost of the investigation, so it is impossible to state definitely what limits should be allowed in all cases, and the conditions might be such that figures approaching 250,000 to 300,000 cubic feet of gas unaccounted for be allowed before a systematic barring over the mains be undertaken.

Question No. 80.—What time should be fixed for a periodic testing of gas meters?

Answer.—The companies which first instituted a system of periodic removal and test of consumers meters placed the period at 3 years. As a result of the experience obtained by working with this period it is now recognized that it is not necessary to test so frequently as this, since meters which have been out for 6 or 7 years show practically no larger average error than those which have only been out for 3 years. It is, therefore, recognized now as good practice to adopt a 7-year period for testing, provided a close watch is kept and systematic tests made for meters not registering at a low rate of consumption. The above applies to the sizes 20-light and under. Larger meters should be brought in for test at least as often as once in 2 years.

Interesting Legal Opinions
RESPECTING GAS PRACTICE.

Necessity for Haste in Repairing Leaks.—Company Held Liable for Injuries Caused by Explosion.

The plaintiff in the case of the Memphis (Tenn.) Consolidated Gas and Electric Company *v.* Creighton, 183 Fed. Rep., 552, occupied a room in the house of Mrs. Bramhall, a patron of the defendant Company. Early one morning it was discovered that several of the rooms in the house were filling with gas to such an extent that one of the occupants of the house had been rendered unconscious. Mrs. Bramhall attempted to shut off the gas but was unable to do so. Thereupon she communicated with the Company, at or near 8 A.M. As to this Mrs. Bramhall testified:

"I told them the gas was escaping, and there was a lady in the house asphyxiated and made unconscious, and we could not cut the gas off; sister and I had tried to and we wanted someone to come and do it right away. They said they would send someone right away." Further, as to substance, she testified that, instead of sending a man "right away," the "complaint clerk" made out a "complaint ticket" some time before noon and sent it to the headquarters of the gasfitters. A fitter arrived on the scene at about 2 o'clock. Meantime, shortly before noon, Mrs. Bramhall, the gas still continuing to escape, was trying to find the place from which it was leaking. To do this she says, when testifying, she lighted a match, and tried the joints of the fixtures. She carried her match along the joints of a fixture back to the cap which covered the opening for the pipe in the wall. The gas coming out around the pipe took fire from the match, and the pent-up gas behind the ceiling exploded. The lath and plaster on the opposite room were blown off, the flooring blown upward, and Mrs. Creighton, who was sitting there, was seriously injured. It subsequently appeared that the gas had escaped through a sandhole in the pipe inside the partition wall.

It was held that the Company was liable to Mrs. Creighton, in that the case was one of concurrent negligence. That is, the negligence of the Company in failing to turn off the gas immediately upon being notified of the leak co-operated with the negligence of Mrs. Bramhall in hunting for the leak with a lighted match. Both parties were liable for the damage caused by the explosion. The negligence of one was no excuse for the other. The Company would not have been liable to Mrs. Bramhall for any injuries which she might have sustained, because she was guilty of contributory negligence, but they were both liable to the plaintiff.—BRADY.

Management & Commercial Methods.

The New Haven Company's Clever Advertising.—The New Haven (Conn.) Gas Light Company has installed a gas "White Way" on Orange street, between Crown and Chapel, which is really the heart of the finest business section of that beautiful city, the effect of which has been most beneficial. The Company is also using half-page spaces in leading newspapers, the descriptive matter in which goes to show convincingly the importance and value of well-lighted streets and store fronts. The Orange street installation, which is typical of that favored by the Company for other installations, just now consists of 12 posts, from which are suspended 24 Humphrey, 5-mantle gas arc lamps.

"*The Reflex, 647-Light.*"—The Welsbach Company has issued an attractive pamphlet covering the sales' campaign method adopted by he Public Service Gas Company, of New Jersey. This No. 647-light has been marketed successfully in Chicago and Detroit, among other cities, and the results have proven very satisfactory.

"*U. G. I.*" *Post Cards.*—The United Gas Improvement Company has issued a series of lighting post cards describing a number of important installations in industrial plants.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

1,007,114. Gas Lamp. M. L. Keisor, Canton, O., assignor to McLain Garwood Company, same place.
1,007,162. Gas Burner. S. B. Warnock, Catlettsburg, Ky.
1,007,293. Gas and Electric Light Fixture. R. T. Kachel, Cleveland, O.
1,007,385. Apparatus for Manufacturing Gas. H. Pettibone, New Rochelle, N. Y., assignor to the Power and Mining Machinery Co.
1,007,538. Gas Burner. J. L. Crawford, Mount Pleasant, Pa.
1,007,664. Gas Regulating Valve. A. G. Baker, Cambridge, Mass., assignor, by mesne assignments, to D. E. Bigelow, New York City.
1,007,712. Regulator for Gas Stoves. F. W. Magee, London, Ontario, Canada, assignor of one-half to T. W. Baker, same place.
1,007,713. Inverted Arc Gas Lamp. F. W. Magee, London, Ontario, Canada, assignor of one-half to T. W. Baker, same place.
1,007,797. Gas Producer. E. Rathbun, Toledo, O.
1,007,860. Gas Lamp. E. A. Gillinder, Philadelphia, Pa., assignor to General Gas Light Company, Kalamazoo, Mich.
1,007,881. Chandelier, C. A. Luther, Chicago, Ills.
1,007,894. Apparatus for Controlling Gas Cocks and Electric Light Switches. B. Scheidemann, Berlin, Germany, assignor of one-half to the firm of Gebruder Neumann, same place.
1,008,011. Machine for Sewing the Heads of Mantles. S. Cohn, New York City, assignor, by mesne assignments, to Mantle Machinery and Patents Company.
1,008,273. System for Distillation. J. M. W. Kitchen, East Orange, N. J.
1,008,274. Producer Gas Apparatus. J. M.W. Kitchen, East Orange, N. J.

Items of Interest
FROM VARIOUS LOCALITIES.

THE Public Service Commission, Second New York District, has assented to the petition of the proprietors of the Cohoes Gas Light Company, for leave to increase its capital stock in the sum of $150,000. It is stipulated that the shares are to be sold at par, to reimburse the Company for expenditures out of income account between the years 1905 to 1910.

THE new proposition of the Tampa (Fla.) Gas Company to the residents of that progressive Southern city, in respect of gas rates, is appended: "Beginning with your November bills our rates will be as follows: For all consumption of gas less than 300 cubic feet per month, a minimum bill of 56 cents, subject to 10 per cent. discount for prompt payment will be rendered. And

"First 1,000 cubic feet, $1.95, gross.
"Second 1,000 " " 1.95, less quantity discount of 2½ per cent.
"Third 1,000 " " 1.95, " " " " 10 " "
"Next 2,000 " " 1.95, " " " " 15 " "
"Next 5,000 " " 1.95, " " " " 20 " "

"From a customer's total bill, computed on the above basis, there will be a further discount of 10 per cent. for prompt payment."

THE Union Mining Company, Proprietors of the Mount Savage Firebrick Works, Mount Savage, Md., inform us that they have recently leased a commodious suite of offices on the 11th floor of the new building of the Fidelity Trust Company, Baltimore, Md., where the offices of the President, as well as those of the Sales' division, are located. The general accounting and manufacturing departments, and also the laboratories, will remain at Mount Savage.

WHILE it may not be in strict accord with the tenets of this column, nevertheless it seems worth while, and not *mal apropos* to note that the Public Service Commission, Second New York District, "has decided that a charge made by the Western Union Telegraph Company to the Postal Telegraph Cable Company for the words constituting the originating address and date upon a telegram transferred by the latter to the former Company is unreasonable, unjust and unduly discriminatory, and the Western Union is required to desist from the practice."

MESSRS. FORSTALL & ROBISON, 58 William street, New York, have been selected by the Company, which selection has been approved by the Public Service Commission, Second District, State of New York, to appraise the physical property of the gas and electric companies in Auburn, and the gas companies in Geneva, Seneca Falls and Waterloo, the recent consolidation of which was noted by us.

NEXT January the Publicity Department, Commercial Vehicle Section, National Automobile Exhibitions, has arranged for an exhibition of motor trucks (the examples to be shown to cover every grade of goods' delivery trucks, wagons, etc.) to take place in New York, January 10 to 17. There can be no doubt about it that motor service is to be the main service from now on in gas company haulage. The Manager of the proposed show is Mr. W. H. Perry, and his address is 7 East 42d street, New York.

WE are in receipt of a well-compiled pamphlet, entitled "Information for the Natural Gas Consumers of Kansas City, Mo.," the author or compiler of which is Mr. Robert W. Goodnow, the City Gas Inspector. The compilation was done at the instance of the Mayor, Darius A. Brown, and that Inspector Goodnow worked in harmony with the city officials would seem proved by the words of commendation given the pamphlet's contents by the Mayor, and the members of the Public Utilities Commission as well. The former, among other things, said this about it: "* * * The Gas Inspector has labored diligently in gathering information in regard to the regulation of gas appliances and in regard to the use of gas, which are of value to the consumer in decreasing his bill and improving his service. * * *" President Harzfeld, of the Public Utilities Commission, by and with the consent of everyone connected with the Commission, in part said: "The accompanying suggestions of the Gas Inspector, Mr. Robt. W. Goodnow, are commended to the people of Kansas City as being well worth their attention."

IN connection with the above, the following, respecting meters tested on complaint for consumers, year 1911, is worth reproducing:

Month.	Absolutely Correct.	Over 2 Per Cent. Fast.	Error in Readings.	Slow.	Within 2 Per Cent. Fast.	Total.
Oct., 1910 ...	0	4	0	3	3	10
Nov., 1910....	2	6	0	2	2	12
Dec., 1910....	3	16	2	8	20	49
Jan., 1911....	3	19	6	27	18	73
Feb., 1911....	2	10	0	10	19	41
March, 1911....	3	18	1	11	24	57
April, 1911....	1	5	1	4	17	28
May, 1911....	1	10	1	5	14	31
June, 1911....	0	9	0	4	8	21
July, 1911....	0	2	0	0	8	10
Aug., 1911....	0	2	1	1	0	4
Sept., 1911....	1	0	1	2	0	4
	16	101	13	77	133	340

"Average of the 101 gas meters over 2 per cent. fast was 4.2 per

cent. fast. Average of the 17 gas meters over 2 per cent. slow was 3.3 per cent. slow. The highest percentage a meter found fast was 12, which findings prove to this office that the trouble in high gas bills is not in the meters, but in the way the gas is used, as 66 per cent. of the meters thought fast by the consumers were correct within the law. We feel we have accomplished a good deal of help to the consumer with our demonstrating apparatus, which is installed in this office, by showing the consumer the gas meter in actual operation, with all working parts exposed to view, instructing one how to read the meter, how to detect a leak in the piping system, and how to adjust the appliances so as to obtain the highest efficiency."

"W. M. M.," writing from Indianapolis, Ind., under date of the 13th inst., says: "I have failed to note in the JOURNAL any sort of lengthy reference to the death of Mr. Walter R. Elliott, Manager for many years of the plants of the St. Augustine (Fla.) Gas and Electric Light Company, who passed away in that city the morning of June 29th, 1911. Knowing that it is your wish to keep record of the changes in our industry, the sad as well as the glad, I venture to send these particulars regarding him. He was born in Indianapolis, Ind., July 30th, 1866, and, when in his 17th year, removed to Philadelphia, and shortly thereafter entered the employ of the United Gas Improvement Company, beginning as a clerk in the auditing department. His rise in this division of its business was rapid, but ill health beset him, and about the mid-eighties he asked for a transfer South, in the hope that the milder climate would stand him in good stead. An opening occurring in St. Augustine, Fla., he was gazetted for it. In due time he became the Company's Agent and as such he continued to the end. He was successful in the administration of its affairs, and while a good manager he was never a martinet. His immediate survivors are his mother and a sister, his widow and a son. Funeral services were held in St. Augustine the afternoon of July 31st, and interment was subsequently made in Kansas City, Mo., later on. He was a member of the National Commercial Gas Association, and many will learn now, likely for the first time, of the death of this most estimable man."

ON Friday, December 1st, an "informal dinner meeting" of the American Institute of Consulting Engineers will be held in the rooms of the Aldene Club, 5th avenue and 23d street, New York. The annual meeting will be held in the headquarters of the Club, 103 Park avenue, on January 16, 1912. At that meeting four members of Council will be voted for, one to serve until January, 1913, and three to serve until January, 1915. The Nominating Committee (Messrs. Hazen, Bingham and Sooysmith) has presented this list, which may be considered the "regular" one: To January, 1913, Prof. George F. Swain, Cambridge, Mass.; to serve until January, 1915, Mr. Alfred Noble, New York; Edward C. Shankland, Chicago; Frank J. Sprague, New York.

MR. MORRIS HICK, formerly in the storekeeper's division of the Suburban (Pa.) Gas Company, is now in charge of the distribution division of the Old Colony Gas Company, with headquarters in Weymouth, Mass.

THE water gas plant recently installed in the works of the Wheeling (W. Va.) Municipal gas system, which installation was supervised by Mr. Wm. A. Baehr, is giving unqualified satisfaction. The Mayor (Mr. C. C. Schmidt) is so pleased with the results that he is proposing to urge the placing of the selling rate at 50 cents per 1,000.

"GENERAL MANAGER SCHUTT, of the Wilmington (Del.) Gas Company is to be credited with having pleasantly 'surprised' the members of the Gas Study Club some evenings ago. The Class was in session, studying intricate pool shots, when the Sergeant at Arms summarily informed them, that their presence was required forthwith in the Lodge Room of the A. O. U. W. Hall. Here they were surprised to be greeted by George Morris and his men, who informed them that the two long rows of tables, piled up with good things, beautifully illuminated by Amber lamps, and attractively marked with flower intertwinings, meant that the Company, through Mr. Schutt, had invited them to dine with it. The feast was given mainly that, through the efforts of the Commercial Division, the number of '44-Amber' lamps placed had passed the 50,000 mark. An excellent dinner, every morsel of which was gas-cooked, was then enjoyed, after which cigars were lighted, and the Club proceeded to an election for officers for the ensuing year. The gentlemen named were: President, Frank Vernon; Treasurer, Irving Vansaut. The heads of the various departments, led by Mr. Schutt, congratulated the men over their success in their efforts to extend the Company's business in a manner that enlisted the friendliness of the consumers, and the pleasant evening was fittingly brought to an end by hearty votes of thanks to the Company and to Manager Schutt.—D. L. D."

THE Chicopee Board of Trade," so writes a prominent resident of that busy Massachusetts town, "recommends the issuing of bonds in the sum of $96,000, which money is to go towards revamping the municipal electric lighting plant, now sadly behind date. The wise thing. however, for Chicopee to do is to sell its socialistic electric lighting plant to the highest bidder. Private ownership will make it a success; public ownership is almost sure to make it a failure."

SINCE the properties of the Fairfield (Conn.) Printing Company have been acquired by Mr. Alfred S. Perry, the motive power for the shops has been changed from steam to gas.

MR. T. A. GLASHIN, who has filled the post of Assistant Superintendent to the Gardner (Mass.) Gas, Fuel and Light Company, has been promoted to the Superintendency, following the reorganization of the corporation. It is a well-deserved promotion, too, for he has rendered it efficient service in minor parts for many years. The Company, although it has been fairly successful in the placing of gas cookers, and kindred apparatus, now proposes to carry on a house-to-house canvass, by an organized force of well-equipped new business getters.

THE authorities of Longmeadow, Mass., virtually now a suburban district of Springfield, in consideration of the Springfield Gas Company having extended its main system to and through their streets, have awarded the public lighting to the Company for a term of 3 years.

ADVICES by way of Troy, N. Y., dated the 10th inst., are: "Preparations are underway to consolidate the interests of the Hudson River Power Company, and its allies in a new Company, according to one who should know. The Companies involved are: The Hudson River Water Power, the Hudson River Electric, the Hudson River Electric Power, the Hudson River Transmission, the Saratoga Gas, Electric Light and Power, the Madison County Gas and Electric, the Empire State Power, of Amsterdam, and the Ballston Spa Light and Power Companies. The named properties have been operated for several years by Messrs. George W. Dunn, Chas. W. Andrews and Milton DeLano, Receivers named by Judge Roy, of the United States District Court." Our informant adds that few changes will be made in the personnel of the operators of the plants, although it is not at all unlikely that Mr. Charles H. Peddrick, Jr., of Glens Falls, N. Y., will not be continued as Manager.

"CAPT. T.," in a line dated the 10th inst., from Brooklyn, N. Y., says: "The men connected with the Flatbush division of the Brooklyn Union Gas Company, had a most enjoyable time on the occasion of their annual reception, which was brought off in McLaughlin's pavilion, the eve of last Election Day. The large number present did not have a slow moment, thanks to the well-directed efforts of the members of the various committees, whose work was directed, respectively, by Messrs. R. O. Sidney, P. F. Finnegan and 'Fred.' Hewitt. The officers of the 'bunch' are: President, J. T. Hefferman; Secretary, J. Murphy; Treasurer, Louis D. Trouell."

WE are assured that Messrs. C. B. Fraley (Boston, Mass.), and W. A. Dodson (Americus, Ga.), mean to construct a gas plant in Cordele, Ga., provided the authorities will grant them a franchise for 25 years, and a maximum selling rate of $1.50 per 1,000 cubic feet. They pledge themselves to begin construction work within 6 months of the issuing of the grant, to lay at least 4 miles of pipes within the city and be in readiness to supply gas within 18 months.

THE plan to construct a gas plant in Waxahachie, Tex., has been restored to action. Some of those interested actively in the project visited the place a few days ago, with the purpose of selecting a site. Amongst the projectors are Messrs. W. T. Utley, R. G. St. John and H. M. Wallace, of Detroit, Mich.; Andrew Fyfe, of Grand Rapids, Mich.; and Hudson T. Morton, of Ann Arbor, Mich.

SUBSCRIBERS to the number of 300 have signed contracts to become customers of the Madera (Cal.) gas plant, the works for which are now being constructed.

The Market for Gas Securities.

The market for city gas shares was steady during the week, the quotations for Consolidated being identical with those last quoted. The feature, though, was Brooklyn Union, which sold at 149 and then back to 147, although the partly expected happened. The Directors declared the usual quarterly dividend of 1½ per cent., and an extra of 1 per cent., both payable January 2d. The books close the 16th prox. This action is taken to mean that hereafter the shares may be classed in the 8 per cent. returners.

Out-of-town shares are dull and neglected, although prices are well held. The Laclede Company's workings for the year, despite the cut in rates and an increased dividend rate, reveal its undeniably healthy condition. The Essex and Hudson (N. J.) Gas Company's regular semi-annual of 4 per cent. is payable the first prox.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

NOVEMBER 20.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	141½	142
Central Union Gas Co.—				
1st 5's, due 1928, J. & J.	3,000,000	1,000	103	105
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	115	118
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	50	70
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	146¾	147
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	509	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¾	1⅛
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	98
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084	—		—
Mortgages, 5's	3,400,000	—		—
General Mortgage 4½	10,661,000	—		—
Con. Gas Co., Baltimore City, 4½	2,751,000	—		—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	78	83
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	88	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	104½	106½
Preferred	2,500,006	100	114	120
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	90¾	91
Preferred	25,000,000	100	95	95½
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	104¾	105
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	108
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	3,447,000	1,000	97	98
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	439	440
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	789	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October, ——, 1912. Atlantic City, N. J. Officers: President, Ira C. Copley, Aurora, Ills. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, ———— Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Next meeting, Syracuse, N. Y., Nov. 1911. Officers: President, R. M. Searle, Rochester, N. Y.; Secretary, C. H. B. Chapin, 39 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, March, 1912. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March, 1912, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, F. E. Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Sept. ————1912, ———— Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York, Secretary, Albert J. Marshall, 16 East 40th street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, A. L. Eustice, 105 North Wabash avenue.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, May, ——, 1912; Lincoln, Neb. Officers: President, G. W. Clabaugh, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, Sept. 1912. Manhattan, Kas. Officers: President, B. F. Eyer, Manhattan, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, Sept. ————1912;———— Officers: President, F. W. Blowers, Kalamazoo, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana, Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December, 1912. Atlanta, Ga. Officers: President, C. L. Holman, St. Louis, Mo.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May, 1912, Kansas City, Mo.; Officers: President, A. B. Macbeth, Independence, Kas. Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1912 Boston. Officers: President, J. A. Coffin, Gloucester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn, Belmar, N. J.

Ohio Gas Association.—Annual meeting, February 6 and 7, 1912, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary-Treasurer, T. C. Jones, Delaware, O.

Oklahoma Gas, Electric and Railway Association.—President, Noel R. Gascho, Alva Okla.; Secretary, H. V. Bozell, Norman, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. ————1912, ———— Officers: President, W. Baurhyte, Los Angeles, Cal.; Vice-President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1912, Williamsport, Pa. Officers, President, C. W. Butterworth, Millon, Pa; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 80th street, New York city.

Southern Gas Association.—Annual meeting, April, 1912, Jacksonville, Fla. Officers, President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. April 27, 28, 29, 1912; Houston, Tex. Officers: President, J. E. Carroll, Beaumont, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 15 and 16, 1912, Milwaukee, Wis. Officers: President, H. M. Buck, Waukesha, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.